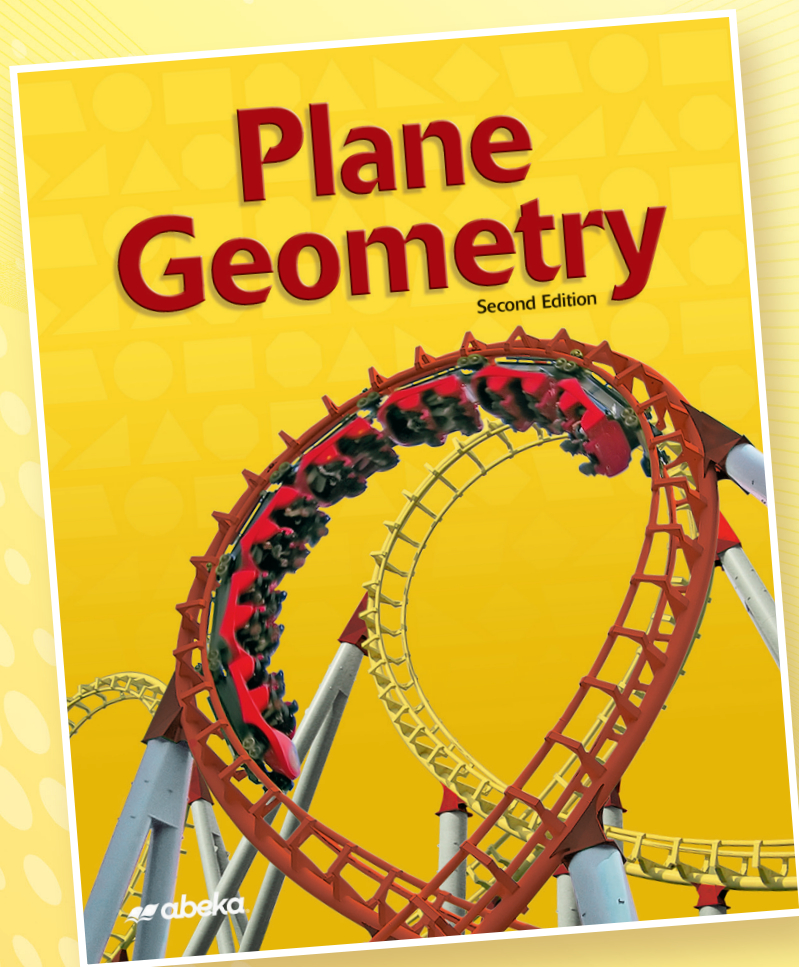


Homeschool

Plane Geometry

Video Manual



Homeschool

Plane Geometry

VIDEO MANUAL

Two Semesters



Pensacola, FL 32523-9100
an affiliate of PENSACOLA CHRISTIAN COLLEGE®

Textbooks & Materials

Student Materials

1. Texts
 - 95370 • *Plane Geometry*
 - 67075 • *Plane Geometry Practice Exercises*
2. Tests / Quizzes
 - 178101 • *Plane Geometry Tests / Quizzes*
3. Supplies (not available from Abeka)
 - Assignment notebook
 - Notebook paper
 - Loose-leaf notebook with 7 dividers
 - Protractor
 - Compass
 - Ruler

Current edition textbooks are required for students in the Abeka Academy accredited program.

Teacher Materials

1. Teacher Keys
 - 95397 • *Plane Geometry Solution Key*
 - 178098 • *Plane Geometry Test / Quiz Key*
2. Optional (may be purchased from Abeka)
 - 95370 • *Plane Geometry*

Homeschool Plane Geometry Video Manual

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VIDEO TEACHER

Mr. Eric Collins

- B.S., Mathematics Education
- M.S., Educational Administration

Introduction

The purpose of this course in plane geometry is to impart to the students an ability to use deductive reasoning for drawing correct conclusions. Rather than merely memorizing a list of geometric facts, students must learn how to use known facts to verify the truth of additional facts and to solve geometric problems. The most important geometric facts are the ones that the students use most frequently, and students will learn them by using them. Therefore, the main objective of this course in plane geometry is to teach students how to think *naturally*, *logically*, and *systematically* whenever they encounter a proof to write, a construction to make, or a problem to solve.

While not all students who take a course in plane geometry will use the geometric facts in their daily lives, the mental skill of reasoning correctly is valuable in all areas of life. From interpreting Scripture correctly to studying mathematics or zoology; from reading a computer program to tracking down the problem in a faulty automobile engine—logic is essential. Learning how to think logically provides students with a tool they may use throughout

life to perform such tasks as identifying the flaw in the argument of a politician, determining which car is the better buy, etc. Certainly, the skill of reasoning correctly is not limited to mathematical applications.

Each video lesson is about 45 minutes in length and will best fit into a 50-minute class period. Five minutes is allotted for you to check homework. You will need to give quizzes and tests personally.

Establish accountability on the part of your student. Let him know you expect him to listen, to learn, and to practice every day as if he were in the same classroom as the video students. Your student will receive the most benefit from these videos when he is involved in the class instead of simply watching it.

Note: Lessons have been recorded for only 170 days, although most school years are longer. The extra days are allotted for the scheduling of semester exams, field trips, or other special events of academic benefit. Time could also be allotted for standardized testing available through abeka.com (1-888-722-0044).

General Information

The course materials have been carefully outlined so that you, as the home teacher, can easily supervise your student's learning. Your main responsibilities are to ensure that the lessons are completed daily, to review material from the book for reinforcement, and to administer and supervise all quizzes and tests. In many ways, you are the key to your student's progress in his courses. Your concern and diligence in helping him

complete his work according to proper procedures will let him know you are determined to help him succeed.

Note: See Appendix B for additional information about grading and recording grades.

Plan a definite time and an environment conducive to learning for your student to complete his work each day. The video lessons are most beneficial when he participates with the class in all oral work.

Equipment and Supplies

Before the first day of class, you should have the following items:

1. computer or DVD player
2. computer monitor or television
3. desk and chair
4. video manual
5. student textbooks
6. teacher materials
7. DVDs (if applicable)
8. additional supplies listed on p. T2

Subject Description

Responsibilities of the Home Teacher

1. **Check Equipment.** Check the equipment each day to make sure it is running properly. Be ready to start on the right lesson.
2. **Follow the Daily Guides.** Check Daily Guides each day to determine specific responsibilities for that day.
3. **Check Homework.** Check daily at the beginning of class that your student has completed his homework. Spot-check the homework quickly (using the *Plane Geometry* Solution Key) to see whether your student is completing the homework problems accurately. It is not necessary to grade the homework unless the Daily Guides instruct otherwise.
4. **Give Practice Exercises.** Practice Exercises are done at the beginning of most lessons from the third week of school until the last month. These short practice exercises are given by you before the video is turned on, during homework check. (The Daily Guides tell when you should do this.) These exercises are in the *Plane Geometry* Practice Exercises book. Answers to the practice exercises are located in Appendix A in the back of this manual.
5. **Give Quizzes, Tests, and Exams.** Three types of instruments are used to evaluate your student's learning: quizzes (including practice exercises), tests, and exams. Quizzes occur weekly and are important for evaluating mastery of recent material. Tests are given over cumulative material in each unit (about every three weeks). Exams are given at the end of a quarter (nine-week period) and are cumulative for all material studied to that point in the course.

Class Schedule

The following is a typical class schedule for Plane Geometry with suggested times for participation.

1. Pre-video Activities.

Homework Check. Begin each day with a five-minute homework check. Assign practice exercises (in the *Plane Geometry*

You will be giving quizzes and tests as they occur in the lessons. Plan to remain in the room during any quiz or test. Grade quizzes for immediate feedback and grade tests for feedback within a day or two of the test. The tests and quizzes are located in *Plane Geometry* Tests/Quizzes. Further quizzing and testing information is provided in the Giving/Grading Quizzes and Tests section on p. T8 of this manual.

6. **Provide Additional Help As Needed.** Consistent participation with the video class in all oral work is essential to your student's success. Encourage your student to use the video class review, the textbook, and his class notes to be prepared for quizzes, tests, and exams. Do not use test questions or paraphrasing of test questions to guide his test preparation.

Suggestions for reviewing with your student:

- Have your student **rework problems missed** in homework or classwork.
- **Call out terms or definitions;** have your student give the corresponding facts.
- **Read the rules or definitions** from the book, omitting a key word or phrase; have your student supply the missing words.
- **Have your student prepare drill cards** with a question on one side and the answer on the other. Use these to call out or show him the question; he gives the answer.
- **Develop practice problems** or exercises that reinforce the course skills.

Practice Exercises book) for your student to do while you check homework. If the Daily Guides instruct you to check homework before turning on the video, you should tell your student which practice exercise to do that day. While your student completes the practice exercises,

spot-check completed homework for accuracy. (Although he may not completely understand a question, he should attempt to answer every question.)

After homework check, you will need to go over the practice exercise answers including the sets which will be graded. The Daily Guides give more details concerning graded practice exercises.

2. Video Activities.

- a. *Homework Presentation.* At the beginning of each video lesson, homework problems are discussed and answered. Video students write their homework problems on the chalkboard and present their work and the answers. Your student should compare his work with the answers on video and make any corrections needed. Your student should follow the homework discussions carefully. At the end of the homework presentation each day, have your student write at the top of his homework the number of correct answers he had for that day.
- b. *Quizzes and Tests.* You will be giving quizzes and tests as they occur in the lessons. Quizzes are usually given after the homework check. The Daily Guides or video will indicate when to give the quiz. The quizzes and tests are from *Plane Geometry Tests / Quizzes* with answers and point values for

each quiz and test in *Plane Geometry Test / Quiz Key*. Further quizzing and testing information is provided in the *Giving / Grading Quizzes and Tests* section on p. T8 of this manual.

- c. *Review and Lesson.* After the homework has been discussed, the video teacher reviews important principles and presents new material. Your student should follow the lesson as he is instructed on video. It is vital that your student pay close attention, use his book, and follow the question-and-answer exchange given on the video. Tell your student to answer the teacher's questions in his mind (or aloud) and to follow closely the answers given by the video students. Paying close attention to this portion of the video lesson will help your student to learn and retain the facts and principles he needs to know.
- d. *Homework Assignment.* The video teacher gives the homework assignment at the conclusion of each lesson. Your student should copy this assignment into his assignment notebook. The homework assignment is listed at the end of each lesson in the Daily Guides. Homework problems are designed for reinforcement of learned skills for mastery.
- e. *Breaks.* Allow for at least a five-minute break between classes.

Student Geometry Notebooks

Each student will compile a geometry notebook for a review resource and study guide. The notebook will consist of the following seven sections:

1. Terms and Definitions
2. Constructions
3. Principles / Axioms / Postulates
4. Informal Statements / Properties / Transformations
5. Theorems / Corollaries
6. Proofs of Theorems and Corollaries
7. Class Notes / Homework Problems

The sections should be separated by labeled notebook dividers. This notebook should be a loose-leaf notebook so that pages can be inserted as the notebook is completed. The video teacher will explain the notebook more thoroughly to the students as the year progresses. The Daily Guides contain instructions for periodically checking the notebooks and keeping them updated.

Sample Pages from a Geometry Notebook

Purpose for Notebook

– to help you begin thinking Geometry thoughts

Notebook Divisions

1. Terms/Definitions
2. Constructions
3. Principles/Axioms
4. Informal Statements
5. Theorems/Corollaries
6. Proofs of Theorems
7. Class Notes

Terms/Definitions

1. Geometry —the study that deals with the properties, measurements, and construction of flat figures, such as angles, triangles, and rectangles; and of solid figures, such as cubes, pyramids, etc.
2. Line —the straight path that extends infinitely in both directions.
3. Point —the location in space that has no size or shape.
4. Plane —a flat surface that extends infinitely in any two directions.
5. Line segment —a part of a line with two endpoints.
6. Equal segments —two segments that have the same length.

Axioms

1. Quantities that are equal to the same quantity or to equal quantities are equal to each other (p. 45).
2. If equals are added to equals, the sums are equal (p. 46).
3. If equals are subtracted from equals, the remainders are equal (p. 47).
4. Doubles of equals are equal (p. 48).
5. Halves of equals are equal (p. 49).

Theorems

1. Two triangles are congruent if two sides and the included angle of one are equal respectively to two sides and the included angle of the other (S.A.S.) p. 57.
2. Two triangles are congruent if a side and the two adjacent angles of one are equal respectively to a side and the two adjacent angles of the other (A.S.A.) p. 61.
3. In any isosceles triangle the angles opposite the equal sides are equal, p. 66.
4. Two triangles are congruent if the three sides of one are equal respectively to the three sides of the other (S.S.S.) p. 70.

Practice Exercises

The short Practice Exercises scheduled at the beginning of class are located in the *Plane Geometry Practice Exercises* book. They are assigned daily during homework check from about the third week of school until the last month. They have a brief explanation included with the exercise if one is needed. The purpose of the exercises is to review and practice mathematical skills and concepts that are in this current mathematics course and in courses that students

have already studied. For instance, several exercises have concepts and problems from elementary algebra and geometry. These are skills that students need to practice to keep mathematics knowledge current. Occasionally, a practice exercise is graded. Do not let your student know a practice exercise will be graded until after he has taken it. You will need to keep record of each practice exercise quiz grade on the Practice Exercise Score Sheet on p. A35 in the back of this manual.

Giving/Grading Quizzes and Tests

The following procedures are used by the video teacher in the classroom. Adapt these procedures to fit your situation while providing appropriate supervision in the handling of graded items.

Procedure for Giving/Grading Quizzes

1. Students clear their desks and take out a pencil, a pen, and one clean sheet of paper for a cover sheet, if needed. Students take quizzes in pencil.
2. Hand out the quiz and have students write their names at the top before beginning the quiz. (Quizzes are located in *Plane Geometry Tests/Quizzes*.)
3. The quiz should take approximately 10 minutes. The allotted time is shown on the video.
4. Instruct students to put their pencils away (off their desks) and to grade in pen.
5. Students exchange quizzes and graders sign their names at the bottom of the quiz.
6. Give instructions for grading—how many points to deduct for each wrong answer and how to mark the papers. (Having students grade the papers in a uniform manner saves time when you go through the papers later.) Grade the quizzes using

the answers and point values given in *Plane Geometry Test/Quiz Key*. On all graded items, subtract 1 point for each misspelled answer; do not subtract more than 5 total points.

7. Give correct answers.
8. Students figure the final grade by subtracting from 100 the total number of points missed. The grade should be written at the top of the paper.
9. If a student has a question about the quiz he is grading, have him place a question mark by both the number in question and the grade at the top.
10. Instruct students to return quizzes to the owners, who should check them briefly and pass them to the front.
11. Go through the quizzes later, checking for question marks and misspelled answers. Record the grades in your grade book.

Note: See Appendix B for additional information about grading and recording grades.

Procedure for Giving/Grading Tests

1. Students clear their desks of everything except two pencils and one clean sheet of paper for a cover sheet, if needed.
2. Hand out the test and have students write their names at the top before beginning the test. (Tests are located in *Plane Geometry Tests/Quizzes*.)

3. Explain any special directions. Students should finish during the time allotted. Also, tell students what is to be done when they finish the test (e.g., what to study).
4. Students take the test in pencil, writing the answers directly on the test paper.
5. Always provide adequate supervision until the test is finished.
6. Collect and grade the tests using answers and point values given in *Plane Geometry Test/Quiz Key*. On graded tests, subtract 1 point for each misspelled answer; do not subtract more than 5 total points. It is best not to record grades in your grade book until after going over the test with the student.
7. Have all tests graded and ready to return in the next lesson.

Note: See Appendix B for additional information about grading and recording grades.

Procedure for Going Over Graded Tests

1. Students clear their desks of everything except a pen. Return graded tests.
2. To go over a test, read the answers in each section. Answer any questions your students may have about a particular test question.
3. Provide adequate supervision while you are going over a test. Students should not have any pencils out while they have graded tests.
4. If students find a question that has been graded incorrectly, they should write (in pen) the number of the incorrectly graded question with a question mark at the top of the first page.
5. Collect tests, check any questions, and record the grades in your grade book.

Averaging Grades

Grades are averaged at the end of the quarter (nine weeks) following these procedures:

1. The average of all **quiz grades** will count as **one-third** of the quarter average. (Be sure to include the average of the graded **Practice Exercises**, which count as one quiz grade.)
2. The average of the **test grades** for the quarter (except for the final test of the quarter) will count as **one-third** of the quarter average.
3. The **final one-third** of the quarter average is the **Quarter, Semester, or Final Exam**.
4. The **semester average** is calculated by averaging two quarter averages. For a first semester average, the first and second quarter averages are averaged; for a second semester average, the third and fourth quarter averages are averaged.

First Quarter Average

$\frac{1}{3}$ **Quiz average** (including average of Practice Exercises)

$\frac{1}{3}$ **Test average**

$\frac{1}{3}$ **Test 3** (Cumulative Quarter Exam)

Example:

Quiz average:	96
Test average:	94
Cumulative exam:	<u>+ 92</u>
Total:	$282 \div 3 = 94$

Second Quarter Average

 $\frac{1}{3}$ **Quiz average** (including average of Practice Exercises) $\frac{1}{3}$ **Test average** $\frac{1}{3}$ **Test 6** (Cumulative Semester Exam)

Example:

$$\begin{array}{r}
 \text{Quiz average:} \quad 90 \\
 \text{Test average:} \quad 93 \\
 \text{Cumulative exam:} \quad + \underline{93} \\
 \text{Total:} \quad 276 \div 3 = 92
 \end{array}$$

First Semester Average

First quarter average**Second quarter average**

Example:

$$\begin{array}{r}
 \text{First quarter average:} \quad 94 \\
 \text{Second quarter average:} \quad + \underline{92} \\
 \text{Total:} \quad 186 \div 2 = 93 \text{ (Semester average)}
 \end{array}$$

Third Quarter Average

 $\frac{1}{3}$ **Quiz average** (including average of Practice Exercises) $\frac{1}{3}$ **Test average** $\frac{1}{3}$ **Test 9** (Cumulative Quarter Exam)

Example:

$$\begin{array}{r}
 \text{Quiz average:} \quad 93 \\
 \text{Test average:} \quad 94 \\
 \text{Cumulative exam:} \quad + \underline{95} \\
 \text{Total:} \quad 282 \div 3 = 94
 \end{array}$$

Fourth Quarter Average

 $\frac{1}{3}$ **Quiz average** (including average of Practice Exercises) $\frac{1}{3}$ **Test average** $\frac{1}{3}$ **Test 12** (Cumulative Final Exam)

Example:

$$\begin{array}{r}
 \text{Quiz average:} \quad 90 \\
 \text{Test average:} \quad 95 \\
 \text{Cumulative exam:} \quad + \underline{97} \\
 \text{Total:} \quad 282 \div 3 = 94
 \end{array}$$

Second Semester Average

Third quarter average**Fourth quarter average**

Example:

$$\begin{array}{r}
 \text{Third quarter average:} \quad 94 \\
 \text{Fourth quarter average:} \quad + \underline{94} \\
 \text{Total:} \quad 188 \div 2 = 94 \text{ (Semester average)}
 \end{array}$$

Plane Geometry

Daily Guides

Daily Guides

Before you begin . . .

The introductory information of this manual along with the Daily Guides provides the assistance needed for a successful school year. The following reminders will help you get off to a great start.

Students' daily supplies:

- current editions of Abeka textbooks required for this course (see p. T2)
- pens
- pencils
- notebook paper
- assignment notebook
- spiral notebook (for taking class notes)

Daily Guides information:

- Pages Taught — what material is covered daily
- Materials Needed — what things to have ready daily
- Teacher Instructions — what to do daily

Helpful tips:

- Explain your daily class procedures.
- View the first few lessons and other lessons as noted in the Daily Guides to familiarize yourself with the video teacher's procedures.
- Remember that your own quiet, orderly routines will be an important part of your learning environment.
- If particular procedures or activities used in the video classroom are not ideal for your unique situation, you should feel free to adjust to your needs. These may or may not be specifically mentioned in the Daily Guides.
- Mastery of key concepts as well as successful comprehension and retention naturally result from training your students to mentally participate and respond with the video class during reviews, drills, and questions.

We trust that these Daily Guides will be a great help as you begin an exciting new school year!

Lesson 1**Pages Taught:**

Plane Geometry pp. vi–viii and 2–4

Materials Needed:

Plane Geometry (student text—needed daily)

Teacher Instructions:

1. Explain your daily class procedures.
2. Check to see that each student has a copy of *Plane Geometry* (referred to as the *text* throughout).
3. Turn on the video. (You may wish to watch the first video lesson to become familiar with classroom procedures.)
4. If time remains after each video lesson, allow students to begin their homework.

Homework:

Set up your geometry notebook. Include extra sheets of paper in each division as well as today's notes.

Page 4: Ex. 1.2, numbers 1–3 (all)

Lesson 2**Pages Taught:**

Plane Geometry pp. 4–7

Materials Needed:

Plane Geometry Solution Key (needed daily)

Teacher Instructions:

1. Homework Check. Instruct students to have homework on their desks for you to check when class begins. (Refer to the guidelines for checking homework in the front of this manual.) Check to see that each student has set up his geometry notebook and has included in it notes from les. 1. Check homework for completeness. It is not necessary for you to grade the homework, but check that the answers are neat and complete. The video teacher goes over the answers on video. Occasionally spot-check your students' answers for accuracy, using the Solution Key.
(*During HW check, students review terms, definitions, and facts from les. 1.*)
2. Turn on the video.

Homework:

Update your geometry notebook.

Pages 6–7: Ex. 1.3B, numbers 1–11 (odd)

Lesson 3**Pages Taught:**

Plane Geometry pp. 7–10

Teacher Instructions:

1. Homework Check. Instruct students to have homework on their desks for you to check when class begins. (Refer to the guidelines for checking homework in the front of this manual.) Check homework for completeness. It is not necessary for you to grade the homework but check that the answers are neat and complete. The video teacher goes over the answers on video. Occasionally spot-check your students' answers for accuracy, using the Solution Key. Follow this procedure throughout the year.
(*During HW check, students review terms, definitions, and facts from les. 1 and 2.*)
2. Turn on the video.

Homework:

Update your geometry notebook.

Page 9: Ex. 1.4, numbers 1–4 (all)

Lesson 4**Pages Taught:**

Plane Geometry p. 10

Materials Needed:

Quiz 1 (from *Plane Geometry* Tests/Quizzes)

Teacher Quiz Key (from *Plane Geometry* Test/Quiz Key)

Teacher Instructions:

1. Homework Check.
(*During HW check, students review terms, definitions, and facts from les. 1–3.*)
2. Turn on the video.
3. Students clear their desks and take out quiz materials (one clean sheet of paper for a cover sheet, a pen, and a pencil) before quizzes are distributed.

4 • Plane Geometry

- Students will take **Quiz 1** with the video class. You will be giving all future quizzes. Refer to the Giving/Grading Quizzes and Tests section in the front of this manual for detailed instructions for giving/grading quizzes.

Note: You may want to preview the video to see quizzing procedures.

- Collect quizzes and record grades. (See the *Plane Geometry Test/Quiz Key* for answers and point values; subtract from 100 the total points missed.)

Note: Subtract 1 point for each misspelled answer; do not subtract more than 5 total points.

Homework:

Update your geometry notebook.

Pages 10–11: Ex. 1.5, numbers 2, 3, 5, and 7

Lesson 5

Pages Taught:

Plane Geometry pp. 11–12

Teacher Instructions:

- Homework Check.
(During HW check, students review terms, definitions, and facts from les. 1–3.)
- Turn on the video.

Homework:

Update your geometry notebook.

Bring a protractor for the next lesson.

Page 12: Ex. 1.6, numbers 1–9 (odd)

Lesson 6

Pages Taught:

Plane Geometry p. 13

Teacher Instructions:

- Homework Check.
(During HW check, students review terms, definitions, and principles from pp. 7–12.)
- Turn on the video.

Homework:

Update your geometry notebook. (Continue throughout the year updating your notebook. This assignment will not be repeated daily unless something special is to be completed.)

Pages 13–14: Ex. 1.7, numbers 1–15 (odd)

Lesson 7

Pages Taught:

Plane Geometry pp. 14–16

Teacher Instructions:

- Homework Check.
(During HW check, students review principles 1–12 in their geometry notebook.)
- Turn on the video.

Homework:

Page 15: Ex. 1.8, numbers 1–9 (odd)

Lesson 8

Pages Taught:

Plane Geometry p. 18

Materials Needed:

Quiz 2 (from *Plane Geometry Tests/Quizzes*)

Teacher Quiz Key (from *Plane Geometry Test/Quiz Key*)

Teacher Instructions:

- Homework Check.
(During HW check, students review sections 1.5–1.7 in the text.)
- Students clear their desks and take out quiz materials (one clean sheet of paper for a cover sheet, a pen, and a pencil) before quizzes are distributed.
- Students will take **Quiz 2**. (Refer to the Giving/Grading Quizzes and Tests section in the front of this manual for detailed instructions about giving/grading quizzes.) Follow this procedure throughout the year.

4. Collect quizzes and record grades. (See the *Plane Geometry Test/Quiz Key* for answers and point values; subtract from 100 the total points missed.)

Note: Subtract 1 point for each misspelled answer; do not subtract more than 5 total points. Follow this procedure throughout the year.

5. Turn on the video.

Homework:

Page 17: Review Exercises, numbers 1, 3, and 7
Page 19: Ex. 1.10B, numbers 5, 6, and 9

Lesson 9

Pages Taught:

Plane Geometry pp. 18–20

Teacher Instructions:

1. Homework Check.
(During HW check, students review sections 1.8–1.10 in the text.)
2. Turn on the video.

Homework:

Page 21: Ex. 1.11, numbers 1, 5, 6, and 11

Lesson 10

Pages Taught:

Plane Geometry pp. 21–22

Materials Needed:

Quiz 3 and Quiz Key

Teacher Instructions:

1. Homework Check.
(During HW check, students review sections 1.8–1.11 in the text.)
2. Give, grade, and collect **Quiz 3**.
3. Turn on the video.

Homework:

Page 22: Ex. 1.12, numbers 5, 7, 9, 11, and 12

Lesson 11

Pages Taught:

Plane Geometry p. 23

Materials Needed:

Practice Exercises (from *Plane Geometry Practice Exercises* book)

Answer Key for *Plane Geometry Practice Exercises* (from Appendix A in the back of this manual)

Teacher Instructions:

1. Homework Check. Students begin today (during homework check time—approximately 2–4 minutes) to work practice exercises for review and reinforcement. Have students take out a sheet of paper and head it correctly. Then have them answer Practice Exercise 1 on the sheet of paper while homework is being checked for completeness. After homework is checked, give the answers to the practice exercise using Answer Key before turning on the video. Students should write the number correct in the top right-hand corner of the sheet of notebook paper. Collect the papers. You may want to tell the students that sometimes the practice exercises will be graded as a quiz. They will not know when they are graded until after they have done the problems. These video lessons tell you when to grade the practice exercises.
(During HW check, students do Practice Exercise 1.)
2. Check geometry notebook for completion. A brief checking procedure such as the following should be sufficient:
 - a. Is the Terms and Definitions section complete?
 - b. Are Principles 1–12 present in the proper division?
 - c. Are the Class Notes neatly arranged in the appropriate section?
 - d. Are the Homework Problems complete and filed under the proper heading?
 Encourage your students to keep their notebooks organized and neatly arranged. An orderly geometry notebook can be a valuable study guide for quizzes and tests.
3. Turn on the video.

Homework:

Page 24: Ex. 1.13, numbers 5 and 7–10

Begin to prepare for a test over sections 1.1–1.14 in les. 14.

Lesson 12

Pages Taught:

Plane Geometry p. 24

Materials Needed:

Practice Exercises (from *Plane Geometry Practice Exercises* book)

Answer Key for *Plane Geometry Practice Exercises* (from Appendix A in the back of this manual)

Note: Since students do practice exercises every day except test days and the day after tests, these materials will not continue to be listed here. Have them available daily.

Teacher Instructions:

1. Homework Check.
(During HW check, students do Practice Exercise 2. They should always do the work on their own paper. Collect the papers.)
2. Turn on the video.

Homework:

Page 25: Ex. 1.14, numbers 6–8, 10, and 11

Lesson 13

Pages Taught:

Review

Materials Needed:

Quiz 4 and Quiz Key

Teacher Instructions:

1. Homework Check.
(During HW check, students do Practice Exercise 3. They should always do the work on their own paper. Collect the papers. Follow this procedure for the remainder of the year.)
2. Turn on the video.
3. Turn off the video. Give, grade, and collect **Quiz 4**.
4. Turn the video back on.

Homework:

Study for Test 1 over text sections 1.1–1.14 in the next lesson.

Lesson 14

Materials Needed:

Test 1 (from *Plane Geometry Tests/Quizzes*)

Test Key (from *Plane Geometry Test/Quiz Key*)

Teacher Instructions:

1. There is no written homework to check.
2. There is no homework assignment.
3. Students clear their desks and take out test materials (two clean sheets of paper, one for a cover sheet and one for a check sheet, and two pencils) before tests are distributed.
4. Turn on the video.
5. After watching the video for test instructions, give **Test 1** over sections 1.1–1.14. You will be giving all tests. Refer to the Giving/Grading Quizzes and Tests section in the front of this manual for detailed instructions for giving/grading tests.
6. Collect and grade tests. (See the *Plane Geometry Test/Quiz Key* for answers and point values; subtract from 100 the total number of points missed.)
7. Plan to return graded Test 1 in les. 15.

Lesson 15

Pages Taught:

Plane Geometry pp. 25–26

Materials Needed:

Graded Test 1 (return to students)

Test Key

Teacher Instructions:

1. There is no homework to check.
2. Hand back and go over graded **Test 1**. Refer to the front of this manual for detailed procedures for going over tests. Collect tests and record grades.
3. Turn on the video.

Homework:

Page 26: Ex. 1.15, numbers 1–6

Lesson 16

Pages Taught:

Plane Geometry pp. 27–29

Teacher Instructions:

1. Homework Check.
(During HW check, students do Practice Exercise 4.)
2. Turn on the video.

Homework:

Page 29: Ex. 1.17, numbers 1–7 (odd) and 8

Lesson 17

Pages Taught:

Plane Geometry pp. 30–33

Materials Needed:

Quiz 5 and Quiz Key

Teacher Instructions:

1. Homework Check.
(During HW check, students do Practice Exercise 5. Grade as **Practice Exercise Quiz 1**; after you have grades for Practice Exercise Quizzes 1–3, average the three grades and record the average as one regular quiz grade. Grading scale: 8 points off for each incorrect answer. Subtract points missed from 100.)
Note: Answers are located in Appendix A. Record grades on Practice Exercise Score Sheet on p. A35 in the back of this manual. Follow this procedure for the remainder of the year.
2. Give, grade, and collect **Quiz 5**.
3. Turn on the video.

Homework:

Pages 31–32: Ex. 1.18, numbers 4–7
Page 32: Ex. 1.19, number 4
Page 33: Ex. 1.20, number 5

Lesson 18

Pages Taught:

Plane Geometry pp. 33–34

Teacher Instructions:

1. Homework Check.
(During HW check, students do Practice Exercise 6.)
2. Turn on the video.

Homework:

Pages 33–34: Do Constructions 4 and 5 one time each.
Page 34: Ex. 1.21, numbers 3–5
Pages 34–35: Ex. 1.22, numbers 2–4

Lesson 19

Pages Taught:

Plane Geometry pp. 35–36

Materials Needed:

Quiz 6 and Quiz Key

Teacher Instructions:

1. Homework Check.
(During HW check, students do Practice Exercise 7.)
2. Turn on the video.
3. Turn off the video. Give, grade, and collect **Quiz 6**.
4. Turn the video back on.

Homework:

Page 35: Ex. 1.23, numbers 1 and 2
Page 36: Ex. 1.24, number 2
Read page 37.
Page 37: Ex. 1.26, numbers 1–5

Lesson 20

Pages Taught:

Plane Geometry pp. 37–39

Teacher Instructions:

1. Homework Check.
(During HW check, students do Practice Exercise 8.)
2. Turn on the video.

Homework:

Pages 38–39: Write each axiom and postulate one time.
Prepare for a construction quiz in the next lesson.

Lesson 21**Pages Taught:***Plane Geometry* pp. 39–40**Materials Needed:**

Quiz 7 and Quiz Key

Teacher Instructions:

1. Homework Check.
(During HW check, students do Practice Exercise 9.)
2. Give, grade, and collect **Quiz 7**.
3. Turn on the video.

Homework:

Page 43: Ex. 1.27, numbers 1–3 and 6

Lesson 22**Pages Taught:***Plane Geometry* pp. 40–47**Teacher Instructions:**

1. Homework Check.
(During HW check, students do Practice Exercise 10.)
2. Turn on the video.

Homework:

Have each axiom and postulate memorized.

Lesson 23**Pages Taught:***Plane Geometry* pp. 46–48**Materials Needed:**

Quiz 8 and Quiz Key

Teacher Instructions:

1. Homework Check.
(During HW check, students do Practice Exercise 11.)
2. Give, grade, and collect **Quiz 8**.
3. Turn on the video.

Homework:

Pages 49–50: Ex. 2.2, numbers 3–7. Notice that partial proofs are provided for problems 3, 5, and 7. Copy the diagram and proof for

each and fill in the blanks. Copy and complete both proofs for problem 7.

Lesson 24**Pages Taught:***Plane Geometry* pp. 50–51**Teacher Instructions:**

1. Homework Check.
(During HW check, students do Practice Exercise 12.)
Note: Homework question #4 on p. 49 is different on video than it is in the book. The answer to the book's updated question is *yes*.
2. Turn on the video.

Homework:

Page 52: Ex. 2.3, numbers 3–5

Lesson 25**Pages Taught:***Plane Geometry* pp. 52–53**Teacher Instructions:**

1. Homework Check.
(During HW check, students do Practice Exercise 13.)
2. Turn on the video.

Homework:

Pages 52–53: Ex. 2.3, numbers 7, 9, and 14

Lesson 26**Pages Taught:***Plane Geometry* pp. 55–56**Teacher Instructions:**

1. Homework Check.
(During HW check, students do Practice Exercise 14. Grade as **Practice Exercise Quiz 2**; after you have grades for Practice Exercise Quizzes 1–3, average the three grades and record the average as one regular quiz grade. Grading scale: 9 points off for each incorrect answer. Subtract points missed from 100.)
2. Turn on the video.

Homework:

Pages 56–57: Ex. 2.4, numbers 2, 4, and 6

Lesson 27**Pages Taught:**

Plane Geometry pp. 57–58

Materials Needed:

Quiz 9 and Quiz Key

Teacher Instructions:

1. Homework Check.
(*During HW check, students do Practice Exercise 15.*)
2. Give, grade, and collect **Quiz 9**.
3. Turn on the video.

Homework:

Pages 53–54: Ex. 2.3, numbers 13 and 15

Lesson 28**Pages Taught:**

Review

Teacher Instructions:

1. Homework Check.
(*During HW check, students do Practice Exercise 16.*)
2. Turn on the video.

Homework:

Study for Test 2 over sections 1.15–2.4 in the next lesson.

Lesson 29**Materials Needed:**

Test 2 and Test Key

Teacher Instructions:

1. There is no written homework to check.
2. There is no video today.
3. Announce the homework.
4. Students clear their desks and take out test materials (two clean sheets of paper, one for a cover sheet and one for a check sheet, and two pencils) before tests are distributed.

5. Give **Test 2** over sections 1.15–2.4. (Refer to the Giving/Grading Quizzes and Tests section in the front of this manual for detailed instructions for giving/grading tests.) Follow this procedure for the remainder of the year.
6. Collect and grade tests. (See the *Plane Geometry* Test/Quiz Key for answers and point values; subtract from 100 the total number of points missed.) Follow this procedure for the remainder of the year.
7. Plan to return graded Test 2 in les. 30.

Homework:

Read p. 44.

Lesson 30**Pages Taught:**

Plane Geometry p. 58

Materials Needed:

Graded Test 2 (return to students) and Test Key

Teacher Instructions:

1. There is no written homework to check.
2. Hand back and go over graded Test 2. Collect tests and record grades.
3. Turn on the video.

Homework:

Pages 58–59: Ex. 2.5, numbers 3, 4b, and 5

Lesson 31**Pages Taught:**

Plane Geometry pp. 59–60

Teacher Instructions:

1. Homework Check. Spot-check to see that students have included Constructions 1–8 and Theorems 1–4 in their notebook.
(*During HW check, students do Practice Exercise 17.*)
2. Turn on the video.

Homework:

Pages 62–63: Ex. 2.7, numbers 1 and 4d–g

Lesson **32****Pages Taught:**

Plane Geometry pp. 61–63

Materials Needed:

Quiz 10 and Quiz Key

Teacher Instructions:

1. Homework Check.
(During HW check, students do Practice Exercise 18.)
2. Give, grade, and collect **Quiz 10**.
3. Turn on the video.

Homework:

Pages 65–66: Ex. 2.8, numbers 3, 5, and 7

Lesson **33****Pages Taught:**

Plane Geometry pp. 64–66

Teacher Instructions:

1. Homework Check.
(During HW check, students do Practice Exercise 19.)
2. Turn on the video.

Homework:

Page 66: Ex. 2.8, numbers 8–10

Lesson **34****Pages Taught:**

Plane Geometry pp. 67–68

Materials Needed:

Quiz 11 and Quiz Key

Teacher Instructions:

1. Homework Check.
(During HW check, students do Practice Exercise 20.)
2. Give, grade, and collect **Quiz 11**.
3. Turn on the video.

Homework:

Page 68: Ex. 2.9, numbers 2, 6, and 7

Lesson **35****Pages Taught:**

Plane Geometry pp. 68–70

Teacher Instructions:

1. Homework Check.
(During HW check, students do Practice Exercise 21.)
2. Turn on the video.

Homework:

Page 70: Ex. 2.10, numbers 1a, 2, and 4. Also, add Corollary 7-3 to your notebook and prove it.

Lesson **36****Pages Taught:**

Plane Geometry pp. 71–72

Teacher Instructions:

1. Homework Check.
(During HW check, students do Practice Exercise 22.)
2. Turn on the video.

Homework:

Page 73: Ex. 2.11, numbers 2 and 3. Also, add Corollary 8-4 to your notebook and prove it.

Lesson **37****Pages Taught:**

Plane Geometry pp. 72–74

Materials Needed:

Quiz 12 and Quiz Key

Teacher Instructions:

1. Homework Check.
(During HW check, students do Practice Exercise 23.)
2. Give, grade, and collect **Quiz 12**.
3. Turn on the video.

Homework:

Pages 73–74: Ex. 2.11, numbers 7–9

Lesson 38**Pages Taught:***Plane Geometry* pp. 74–77**Teacher Instructions:**

1. Homework Check.
(During HW check, students do Practice Exercise 24.)
2. Turn on the video.

Homework:

Page 74: Ex. 2.11, numbers 12–15. Problem 12 does not require a proof.

Lesson 39**Pages Taught:***Plane Geometry* pp. 77–78**Teacher Instructions:**

1. Homework Check.
(During HW check, students do Practice Exercise 25.)
2. Turn on the video.

Homework:

Page 79: Ex. 2.13, number 7
Page 82: Ex. 2.14, numbers 2 and 4

Lesson 40**Pages Taught:***Plane Geometry* pp. 78–79**Teacher Instructions:**

1. Homework Check.
(During HW check, students do Practice Exercise 26.)
2. Turn on the video.

Homework:

Page 82: Ex. 2.14, numbers 3 and 6

Lesson 41**Pages Taught:***Plane Geometry* pp. 79, 83–84**Materials Needed:**

Quiz 13 and Quiz Key

Teacher Instructions:

1. Homework Check.
(During HW check, students do Practice Exercise 27. Grade as **Practice Exercise Quiz 3**; after you have grades for Practice Exercise Quizzes 1–3, average the three grades and record the average as one regular quiz grade. Grading scale: 8 points off for each incorrect answer. Subtract points missed from 100.)
2. Give, grade, and collect **Quiz 13**.
3. Turn on the video.

Homework:

Page 82: Ex. 2.14, numbers 5 and 8

Lesson 42**Pages Taught:***Plane Geometry* pp. 84–85**Teacher Instructions:**

1. Homework Check.
(During HW check, students do Practice Exercise 28.)
2. Turn on the video.

Homework:

Page 82: Ex. 2.14, number 11
Page 89: Ex. 2.16, number 1

Lesson 43**Pages Taught:**

Review

Teacher Instructions:

1. Homework Check.
(During HW check, students do Practice Exercise 29.)
2. Turn on the video.

Homework:

Study for Test 3 (Nine-Weeks Exam) over sections 1.1–2.16 in the next lesson. Bring a compass and straightedge for the test.

Lesson **44****Materials Needed:**

Test 3 (Nine-Weeks Exam) and Test Key

Teacher Instructions:

1. There is no written homework to check.
2. There is no video today.
3. Announce the homework assignment.
4. Students clear their desks and take out test materials (two clean sheets of paper, one for a cover sheet and one for a check sheet, and two pencils) before tests are distributed.
5. Give **Test 3** (Nine-Weeks Exam) over sections 1.1–2.16. Collect and grade tests.
6. Plan to return graded Test 3 in les. 45.

Homework:

Read pp. 80–81.

Lesson **45****Pages Taught:**

Plane Geometry pp. 86–87

Materials Needed:

Graded Test 3 (return to students) and Test Key

Teacher Instructions:

1. There is no written homework to check.
2. Hand back and go over graded Test 3. Collect tests and record grades.
3. Turn on the video.

Homework:

Page 90: Ex. 2.16, numbers 3–6

Lesson **46****Pages Taught:**

Plane Geometry pp. 88–91

Teacher Instructions:

1. Homework Check.
(*During HW check, students do Practice Exercise 30.*)
2. Turn on the video.

Homework:

Page 90: Ex. 2.16, numbers 8 and 10

Lesson **47****Pages Taught:**

Plane Geometry pp. 93–94

Materials Needed:

Quiz 14 and Quiz Key

Teacher Instructions:

1. Homework Check.
(*During HW check, students do Practice Exercise 31.*)
2. Give, grade, and collect **Quiz 14**.
3. Turn on the video.

Homework:

Add Theorem 20 to your notebook and prove it.
Page 95: Ex. 2.18, numbers 4 and 8

Lesson **48****Pages Taught:**

Plane Geometry pp. 94–96

Teacher Instructions:

1. Homework Check.
(*During HW check, students do Practice Exercise 32.*)
2. Turn on the video.

Homework:

Page 96: Ex. 2.19, numbers 1, 3, 4, and 7

Lesson **49****Pages Taught:**

Plane Geometry pp. 96–97

Materials Needed:

Quiz 15 and Quiz Key

Teacher Instructions:

1. Homework Check.
(*During HW check, students do Practice Exercise 33.*)
2. Give, grade, and collect **Quiz 15**.
3. Turn on the video.

Homework:

Page 97: Ex. 2.20, numbers 1, 8, and 12

Lesson 50**Pages Taught:**

Plane Geometry pp. 98–102

Teacher Instructions:

1. Homework Check.
(*During HW check, students do Practice Exercise 34.*)
2. Turn on the video.

Homework:

Pages 101–102: Ex. 2.21, numbers 1, 2, 8, and 9
Be prepared for a geometry notebook check in les. 53.

Lesson 51**Pages Taught:**

Plane Geometry pp. 102–105

Teacher Instructions:

1. Homework Check.
(*During HW check, students do Practice Exercise 35.*)
2. Turn on the video.

Homework:

Page 102: Ex. 2.21, numbers 4 and 10
Page 106: Ex. 2.22, numbers 1 and 4

Lesson 52**Pages Taught:**

Plane Geometry pp. 107–108

Materials Needed:

Quiz 16 and Quiz Key

Teacher Instructions:

1. Homework Check.
(*During HW check, students do Practice Exercise 36.*)
2. Turn on the video.
3. Turn off the video. Give, grade, and collect **Quiz 16**.
4. Turn the video back on.

Homework:

Add Theorem 29, Corollary 29-1, and Theorem 30 to your notebook. Do not prove them.
Page 111: Ex. 2.24, numbers 1–4
Geometry notebooks will be checked in the next lesson.

Lesson 53**Pages Taught:**

Plane Geometry pp. 109–113

Teacher Instructions:

1. Homework Check. Spot-check to see that recent theorems are written in each student's notebook (through Theorem 30); also check to see that completed homework assignments have been placed in the proper location.
(*During HW check, students do Practice Exercise 37.*)
2. Turn on the video.

Homework:

Page 111: Ex. 2.24, number 6
Page 113: Ex. 2.25, numbers 1 and 2

Lesson 54**Pages Taught:**

Plane Geometry pp. 114–117

Materials Needed:

Quiz 17 and Quiz Key

Teacher Instructions:

1. Homework Check.
(*During HW check, students do Practice Exercise 38.*)
2. Give, grade, and collect **Quiz 17**.
3. Turn on the video.

Homework:

Page 118: Ex. 2.30, numbers 1, 5, and 8

Lesson 55**Pages Taught:***Plane Geometry* p. 120**Teacher Instructions:**

- Homework Check.
(During HW check, students do *Practice Exercise 39*. Grade as **Practice Exercise Quiz 4**; after you have grades for *Practice Exercise Quizzes 4–6*, average the three grades and record the average as one regular quiz grade. Grading scale: 8 points off for each incorrect answer. Subtract points missed from 100.)
- Turn on the video.

Homework:

Pages 118–119: Ex. 2.31, numbers 1, 6, and 18

Lesson 56**Pages Taught:***Plane Geometry* p. 121**Materials Needed:**

Quiz 18 and Quiz Key

Teacher Instructions:

- Homework Check.
(During HW check, students do *Practice Exercise 40*.)
- Give, grade, and collect **Quiz 18**.
- Turn on the video.

Homework:

Pages 120–121: Ex. 2.33, numbers 3, 4, and 9

Lesson 57**Pages Taught:**

Review

Teacher Instructions:

- Homework Check.
(During HW check, students do *Practice Exercise 41*.)
- Turn on the video.

Homework:

Study for Test 4 over sections 2.17–2.33 in the next lesson.

Lesson 58**Materials Needed:**

Test 4 and Test Key

Teacher Instructions:

- There is no written homework to check.
- There is no video today.
- Announce the homework assignment.
- Students clear their desks and take out test materials (two clean sheets of paper, one for a cover sheet and one for a check sheet, and two pencils) before tests are distributed.
- Give **Test 4** over sections 2.17–2.33. Collect and grade tests.
- Plan to return graded Test 4 in les. 59.

Homework:

Read pp. 92 and 129–130.

Lesson 59**Pages Taught:***Plane Geometry* p. 122**Materials Needed:**

Graded Test 4 (return to students) and Test Key

Teacher Instructions:

- There is no written homework to check.
- Hand back and go over graded Test 4. Collect tests and record grades.
- Turn on the video.

Homework:

Page 122: Ex. 2.34, numbers 4 and 9

Lesson 60**Pages Taught:***Plane Geometry* pp. 123–124**Materials Needed:**

Quiz 19 and Quiz Key

Teacher Instructions:

1. Homework Check.
(During HW check, students do Practice Exercise 42.)
2. Give, grade, and collect **Quiz 19**.
3. Turn on the video.

Homework:

Page 124: Ex. 2.36, numbers 3, 7, 9, and 12a

Lesson 61**Pages Taught:**

Plane Geometry pp. 125–126

Teacher Instructions:

1. Homework Check.
(During HW check, students do Practice Exercise 43. Grade as **Practice Exercise Quiz 5**; after you have grades for Practice Exercise Quizzes 4–6, average the three grades and record the average as one regular quiz grade. Grading scale: 8 points off for each incorrect answer. Subtract points missed from 100.)
2. Turn on the video.

Homework:

Page 125: Ex. 2.37, numbers 5 and 7
Page 127: Ex. 2.38, number 8

Lesson 62**Pages Taught:**

Plane Geometry p. 132

Materials Needed:

Quiz 20 and Quiz Key

Teacher Instructions:

1. Homework Check.
(During HW check, students do Practice Exercise 44.)
2. Give, grade, and collect **Quiz 20**.
3. Turn on the video.

Homework:

Page 133: Ex. 3.1, numbers 3 and 5

Lesson 63**Pages Taught:**

Plane Geometry pp. 133–134

Teacher Instructions:

1. Homework Check.
(During HW check, students do Practice Exercise 45.)
2. Turn on the video.

Homework:

Page 134: Ex. 3.2, numbers 1, 2, and 6

Lesson 64**Pages Taught:**

Plane Geometry p. 135

Materials Needed:

Quiz 21 and Quiz Key

Teacher Instructions:

1. Homework Check.
(During HW check, students do Practice Exercise 46.)
2. Give, grade, and collect **Quiz 21**.
3. Turn on the video.

Homework:

Page 135: Ex. 3.3, number 1a
Page 136: Ex. 3.4, number 1

Lesson 65**Pages Taught:**

Plane Geometry pp. 136–137

Teacher Instructions:

1. Homework Check.
(During HW check, students do Practice Exercise 47.)
2. Turn on the video.

Homework:

Page 134: Ex. 3.2, number 5
Page 137: Ex. 3.5 (There is only one problem.)

Lesson 66**Pages Taught:***Plane Geometry* p. 138**Materials Needed:**

Quiz 22 and Quiz Key

Teacher Instructions:

1. Homework Check.
(During HW check, students do Practice Exercise 48.)
2. Give, grade, and collect **Quiz 22**.
3. Turn on the video.

Homework:

Page 138: Ex. 3.6, numbers 1 and 3

Lesson 67**Pages Taught:***Plane Geometry* pp. 138–140**Teacher Instructions:**

1. Homework Check.
(During HW check, students do Practice Exercise 49.)
2. Turn on the video.

Homework:

Page 141: Ex. 3.7, numbers 2 and 4–6

Lesson 68**Pages Taught:***Plane Geometry* p. 141**Teacher Instructions:**

1. Homework Check.
(During HW check, students do Practice Exercise 50.)
2. Turn on the video.

Homework:

Page 141: Ex. 3.7, numbers 8, 11, and 14

Lesson 69**Pages Taught:***Plane Geometry* pp. 142–143**Teacher Instructions:**

1. Homework Check.
(During HW check, students do Practice Exercise 51.)
2. Turn on the video.

Homework:

Page 143: Ex. 3.8, numbers 1–3

Lesson 70**Pages Taught:**

Review

Materials Needed:

Quiz 23 and Quiz Key

Teacher Instructions:

1. Homework Check.
(During HW check, students do Practice Exercise 52.)
2. Give, grade, and collect **Quiz 23**.
3. Turn on the video.

Homework:

Study for Test 5 over sections 2.34–3.8 in the next lesson.

Lesson 71**Materials Needed:**

Test 5 and Test Key

Teacher Instructions:

1. There is no written homework to check.
2. There is no video today.
3. Announce the homework assignment.
4. Students clear their desks and take out test materials (two clean sheets of paper, one for a cover sheet and one for a check sheet, and two pencils) before tests are distributed.
5. Give **Test 5** over sections 2.34–3.8. Collect and grade tests.
6. Plan to return graded Test 5 in les. 72.

Homework:

Read pp. 167 and 172.

Lesson 72**Pages Taught:**

Plane Geometry p. 144

Materials Needed:

Graded Test 5 (return to students) and Test Key

Teacher Instructions:

1. There is no written homework to check.
2. Hand back and go over graded Test 5. Collect tests and record grades.
3. Turn on the video.

Homework:

Page 144: Ex. 3.9, numbers 1 and 2

Lesson 73**Pages Taught:**

Plane Geometry pp. 145–146

Teacher Instructions:

1. Homework Check.
(During HW check, students do Practice Exercise 53.)
2. Turn on the video.

Homework:

Page 146: Ex. 3.10, numbers 4, 5, and 9

Lesson 74**Pages Taught:**

Plane Geometry pp. 147–150

Teacher Instructions:

1. Homework Check.
(During HW check, students do Practice Exercise 54.)
2. Turn on the video.

Homework:

Pages 147–148: Ex. 3.12, numbers 10 and 14

Lesson 75**Pages Taught:**

Plane Geometry pp. 150–151

Teacher Instructions:

1. Homework Check.
(During HW check, students do Practice Exercise 55.)
2. Turn on the video.

Homework:

Pages 151–152: Ex. 3.14, numbers 3, 4, and 6

Lesson 76**Pages Taught:**

Plane Geometry p. 151

Materials Needed:

Quiz 24 and Quiz Key

Teacher Instructions:

1. Homework Check.
(During HW check, students do Practice Exercise 56.)
2. Give, grade, and collect **Quiz 24**.
3. Turn on the video.

Homework:

Page 152: Ex. 3.14 (top of the page), numbers 5 and 8

Lesson 77**Pages Taught:**

Plane Geometry pp. 152–153

Teacher Instructions:

1. Homework Check.
(During HW check, students do Practice Exercise 57.)
2. Turn on the video.

Homework:

Page 152: Ex. 3.15, (at bottom of page) number 7
Page 153: Ex. 3.16, numbers 5 and 6

Lesson **78****Pages Taught:**

Plane Geometry p. 153

Teacher Instructions:

1. Homework Check.
(*During HW check, students do Practice Exercise 58.*)
2. Turn on the video.

Homework:

Page 154: Ex. 3.17, numbers 5–7 and 9

Lesson **79****Pages Taught:**

Plane Geometry p. 156

Teacher Instructions:

1. Homework Check.
(*During HW check, students do Practice Exercise 59. Grade as **Practice Exercise Quiz 6**; after you have grades for Practice Exercise Quizzes 4–6, average the three grades and record the average as one regular quiz grade. Grading scale: 6 points off for each incorrect answer. Subtract points missed from 100.*)
2. Turn on the video.

Homework:

Page 155: Ex. 3.18, numbers 3 and 5

Lesson **80****Pages Taught:**

Plane Geometry pp. 156–157

Materials Needed:

Quiz 25 and Quiz Key

Teacher Instructions:

1. Homework Check.
(*During HW check, students do Practice Exercise 60.*)
2. Give, grade, and collect **Quiz 25**.

3. Turn on the video.

Note: Students will take Test 6 (Semester Exam) in lesson 85. Plan to allow 20–30 minutes extra for this exam. Students should not have more than two major exams in one day.

Homework:

Pages 156–157: Ex. 3.19A, numbers 4 and 6

Lesson **81****Pages Taught:**

Plane Geometry pp. 157–158

Teacher Instructions:

1. Homework Check.
(*During HW check, students do Practice Exercise 61.*)
2. Turn on the video.

Homework:

Page 157: Ex. 3.19B, numbers 4 and 6

Lesson **82****Pages Taught:**

Plane Geometry p. 158

Teacher Instructions:

1. Homework Check.
(*During HW check, students do Practice Exercise 62.*)
2. Turn on the video.

Homework:

Page 158: Ex. 3.19D, numbers 1 and 9

Lesson **83****Pages Taught:**

Review

Materials Needed:

Quiz 26 and Quiz Key

Teacher Instructions:

1. Homework Check.
(*During HW check, students do Practice Exercise 63.*)

2. Give, grade, and collect **Quiz 26**.
3. Turn on the video.

Homework:

Page 159: Ex. 3.19F, numbers 5 and 6

Page 161: Ex. 3.19G, numbers 1–3

Lesson 84**Pages Taught:**

Review

Teacher Instructions:

1. Homework Check.
(*During HW check, students do Practice Exercise 64.*)
2. Turn on the video.

Homework:

Study for Test 6 (Semester Exam) over sections 1.1–3.19 in the next lesson.

Lesson 85**Materials Needed:**

Test 6 (Semester Exam) and Test Key

Teacher Instructions:

1. There is no written homework to check.
2. There is no video today.
3. Announce the homework assignment.
4. Students clear their desks and take out test materials (two clean sheets of paper, one for a cover sheet and one for a check sheet, and two pencils) before tests are distributed.
5. Give **Test 6** (Semester Exam) over sections 1.1–3.19. Collect and grade tests.
Note: Students will take (Test 6) Semester Exam. Plan to allow 20–30 minutes extra for students to take this exam. Students should not have more than two major exams in one day.
6. Plan to return graded Test 6 in les. 86.

Homework:

Geometry notebooks will be checked in les. 90. Bring compass and straightedge for the next lesson.
Read pp. 187–188.

Lesson 86**Pages Taught:**

Plane Geometry pp. 162–164

Materials Needed:

Graded Test 6 (return to students) and Test Key

Teacher Instructions:

1. There is no written homework to check.
2. Hand back and go over graded Test 6. Collect tests and record grades.
3. Turn on the video.

Homework:

Pages 162–163: Construction 4, Cases 1 and 2

Page 164: Ex. 3.21, numbers 1 and 4

Lesson 87**Pages Taught:**

Plane Geometry pp. 164–166

Teacher Instructions:

1. Homework Check.
(*During HW check, students do Practice Exercise 65.*)
2. Turn on the video.

Homework:

Pages 164–166: Constructions 10, 11, and 12

Page 166: Ex. 3.24, number 1

Lesson 88**Pages Taught:**

Plane Geometry pp. 166, 168

Teacher Instructions:

1. Homework Check.
(*During HW check, students do Practice Exercise 66.*)
2. Turn on the video.

Homework:

Pages 166, 168: Constructions 13 and 14

Page 168: Ex. 3.26, numbers 1 and 2

Lesson 89

Pages Taught:

Plane Geometry pp. 169–171

Materials Needed:

Quiz 27 and Quiz Key

Teacher Instructions:

1. Homework Check.
(During HW check, students do *Practice Exercise 67*.)
2. Give, grade, and collect **Quiz 27**.
3. Turn on the video.

Homework:

Prepare for geometry notebook check in the next lesson.

Page 168: Ex. 3.26, numbers 4 and 5

Lesson 90

Pages Taught:

Plane Geometry pp. 173–174

Materials Needed:

Quiz 28 and Quiz Key

Teacher Instructions:

1. Homework Check. Spot-check to see that recent theorems (through Theorem 46) and recent constructions (through Construction 16) are written in each student's notebook.
(During HW check, students do *Practice Exercise 68*.)
2. Give, grade, and collect **Quiz 28**.
3. Turn on the video.

Homework:

Pages 173–174: Ex. 3.29, numbers 2–8 (even)

Lesson 91

Pages Taught:

Plane Geometry pp. 174–176

Teacher Instructions:

1. Homework Check.
(During HW check, students do *Practice Exercise 69*. Grade as **Practice Exercise Quiz 7**; after you have grades for *Practice Exercise Quizzes 7–9*, average the three grades and record the average as one regular quiz grade. Grading scale: 8 points off for each incorrect answer. Subtract points missed from 100.)
2. Turn on the video.

Homework:

Pages 174–176: Memorize the concept and picture for locus Theorems 47–52.

Lesson 92

Pages Taught:

Review

Teacher Instructions:

1. There is no written homework to check.
(Students do *Practice Exercise 70*.)
2. Turn on the video.

Homework:

Page 177: Ex. 3.31, numbers 8–10

Lesson 93

Pages Taught:

Plane Geometry pp. 177–178

Materials Needed:

Quiz 29 and Quiz Key

Teacher Instructions:

1. Homework Check.
(During HW check, students do *Practice Exercise 71*.)
2. Give, grade, and collect **Quiz 29**.
3. Turn on the video.

Homework:

Page 178: Ex. 3.32, numbers 2–8 (even)

Lesson 94**Pages Taught:**

Plane Geometry pp. 179–181

Teacher Instructions:

1. Homework Check.
(During HW check, students do Practice Exercise 72.)
2. Turn on the video.

Homework:

Page 181: Ex. 3.33, numbers 1–3 and 10

Materials Needed:

Quiz 31 and Quiz Key

Teacher Instructions:

1. Homework Check.
(During HW check, students do Practice Exercise 75.)
2. Give, grade, and collect **Quiz 31**.
3. Turn on the video.

Homework:

Page 184: Ex. 3.37, numbers 4, 6, and 8

Page 185: Ex. 3.38, number 2

Lesson 95**Pages Taught:**

Plane Geometry pp. 182–183

Materials Needed:

Quiz 30 and Quiz Key

Teacher Instructions:

1. Homework Check.
(During HW check, students do Practice Exercise 73.)
2. Give, grade, and collect **Quiz 30**.
3. Turn on the video.

Homework:

Page 182: Ex. 3.33, numbers 14, 16, 20, and 21

Lesson 98**Pages Taught:**

Review

Teacher Instructions:

1. Homework Check.
(During HW check, students do Practice Exercise 76.)
2. Turn on the video.

Homework:

Study for Test 7 over sections 3.20–3.38 in the next lesson.

Lesson 96**Pages Taught:**

Plane Geometry pp. 182–184

Teacher Instructions:

1. Homework Check.
(During HW check, students do Practice Exercise 74.)
2. Turn on the video.

Homework:

Pages 182–183: Ex. 3.34, numbers 2, 5, 10, and 12

Materials Needed:

Test 7 and Test Key

Teacher Instructions:

1. There is no written homework to check.
2. There is no video today.
3. Announce the homework assignment.
4. Students clear their desks and take out test materials (two clean sheets of paper, one for a cover sheet and one for a check sheet, and two pencils) before tests are distributed.
5. Give **Test 7** over sections 3.20–3.38. Collect and grade tests.
6. Plan to return graded Test 7 in les. 100.

Homework:

Read pp. 202 and 217–218.

Lesson 97**Pages Taught:**

Plane Geometry p. 184

Lesson **100****Pages Taught:**

Plane Geometry pp. 190–192

Materials Needed:

Graded Test 7 (return to students) and Test Key

Teacher Instructions:

1. There is no written homework to check.
2. Hand back and go over graded Test 7. Collect tests and record grades.
3. Turn on the video.

Homework:

Pages 191–192: Ex. 4.1, numbers 4, 5, and 7–11. On exercises with lettered problems, do letters b, d, and f.

Lesson **101****Pages Taught:**

Plane Geometry pp. 192–193

Teacher Instructions:

1. Homework Check.
(*During HW check, students do Practice Exercise 77.*)
2. Turn on the video.

Homework:

Page 194: Ex. 4.2, numbers 1b, 5, 6b, and 7–9

Lesson **102****Pages Taught:**

Plane Geometry pp. 194–195

Teacher Instructions:

1. Homework Check.
(*During HW check, students do Practice Exercise 78.*)
2. Turn on the video.

Homework:

Page 196: Ex. 4.3, numbers 2, 3, 5b, and 7

Lesson **103****Pages Taught:**

Plane Geometry pp. 196–197

Materials Needed:

Quiz 32 and Quiz Key

Teacher Instructions:

1. Homework Check.
(*During HW check, students do Practice Exercise 79. Grade as **Practice Exercise Quiz 8**; after you have grades for Practice Exercise Quizzes 7–9, average the three grades and record the average as one regular quiz grade. Grading scale: 7 points off for each incorrect answer. Subtract points missed from 100.*)
2. Give, grade, and collect **Quiz 32**.
3. Turn on the video.

Homework:

Page 199: Ex. 4.4, numbers 2–5

Lesson **104****Pages Taught:**

Plane Geometry pp. 197–199

Teacher Instructions:

1. Homework Check.
(*During HW check, students do Practice Exercise 80.*)
2. Turn on the video.

Homework:

Page 199: Ex. 4.4, numbers 8–11

Lesson **105****Pages Taught:**

Plane Geometry p. 200

Teacher Instructions:

1. Homework Check.
(*During HW check, students do Practice Exercise 81.*)
2. Turn on the video.

Homework:

Page 201: Ex. 4.5, numbers 2, 3, 5, and 8

Lesson 106**Pages Taught:**

Plane Geometry pp. 203–204

Teacher Instructions:

1. Homework Check.
(During HW check, students do Practice Exercise 82.)
2. Turn on the video.

Homework:

Page 204: Ex. 4.6, numbers 1–4

Lesson 107**Pages Taught:**

Plane Geometry pp. 204–205

Teacher Instructions:

1. Homework Check.
(During HW check, students do Practice Exercise 83.)
2. Turn on the video.

Homework:

Pages 205–206: Prove Corollaries 57-1, 57-2, and 58-1.

Lesson 108**Pages Taught:**

Plane Geometry pp. 205–207

Teacher Instructions:

1. Homework Check.
(During HW check, students do Practice Exercise 84.)
2. Turn on the video.

Homework:

Page 207: Ex. 4.7, numbers 3, 4, and 6

Lesson 109**Pages Taught:**

Plane Geometry pp. 207–208

Materials Needed:

Quiz 33 and Quiz Key

Teacher Instructions:

1. Homework Check.
(During HW check, students do Practice Exercise 85.)
2. Give, grade, and collect **Quiz 33**.
3. Turn on the video.

Homework:

Pages 208–209: Ex. 4.8, numbers 1, 4, and 11

Lesson 110**Pages Taught:**

Plane Geometry pp. 208–210

Teacher Instructions:

1. Homework Check.
(During HW check, students do Practice Exercise 86.)
2. Turn on the video.

Homework:

Page 209: Ex. 4.9, number 1
Page 210: Ex. 4.10, numbers 3 and 4

Lesson 111**Pages Taught:**

Plane Geometry pp. 210–211

Teacher Instructions:

1. Homework Check.
(During HW check, students do Practice Exercise 87. Grade as **Practice Exercise Quiz 9**; after you have grades for Practice Exercise Quizzes 7–9, average the three grades and record the average as one regular quiz grade. Grading scale: 8 points off for each incorrect answer. Subtract points missed from 100.)
2. Turn on the video.

Homework:

Pages 210–211: Ex. 4.10, numbers 2, 7, 8, and 11

Lesson 112**Pages Taught:**

Review

Materials Needed:

Quiz 34 and Quiz Key

Teacher Instructions:

1. Homework Check.
(During HW check, students do Practice Exercise 88.)
2. Give, grade, and collect **Quiz 34**.
3. Turn on the video.

Homework:

Study for Test 8 over sections 4.1–4.10 in the next lesson.

Lesson 113**Materials Needed:**

Test 8 and Test Key

Teacher Instructions:

1. There is no written homework to check.
2. There is no video today.
3. Announce the homework assignment.
4. Students clear their desks and take out test materials (two clean sheets of paper, one for a cover sheet and one for a check sheet, and two pencils) before tests are distributed.
5. Give **Test 8** over sections 4.1–4.10. Collect and grade tests.
6. Plan to return graded Test 8 in les. 114.

Homework:

Read pp. 231–232.

Lesson 114**Pages Taught:***Plane Geometry* pp. 211–212**Materials Needed:**

Graded Test 8 (return to students) and Test Key

Teacher Instructions:

1. There is no written homework to check.
2. Hand back and go over graded Test 8. Collect tests and record grades.
3. Turn on the video.

Homework:

Page 211: Prove Corollary 62-1.

Page 212: Ex. 4.11, numbers 1–4

Lesson 115**Pages Taught:***Plane Geometry* pp. 212–213**Teacher Instructions:**

1. Homework Check.
(During HW check, students do Practice Exercise 89.)
2. Turn on the video.

Homework:

Page 213: Ex. 4.12, numbers 2, 3, 4, 6, and 7

Lesson 116**Pages Taught:***Plane Geometry* pp. 213–215**Teacher Instructions:**

1. Homework Check.
(During HW check, students do Practice Exercise 90.)
2. Turn on the video.

Homework:

Page 214: Ex. 4.12, numbers 13 and 14

Page 215: Ex. 4.13, numbers 1 and 3

Lesson 117**Pages Taught:***Plane Geometry* pp. 219–221

Teacher Instructions:

1. Homework Check.
(During HW check, students do Practice Exercise 91.)
2. Turn on the video.

Homework:

Page 221: Ex. 4.17, numbers 1a, 2, and 7–9
Study for a quiz over sections 4.12–4.14.

Lesson 118**Pages Taught:**

Plane Geometry pp. 221–222

Materials Needed:

Quiz 35 and Quiz Key

Teacher Instructions:

1. Homework Check.
(During HW check, students do Practice Exercise 92.)
2. Give, grade, and collect **Quiz 35**.
3. Turn on the video.

Homework:

Bring compass and straightedge for the next several lessons.
Page 222: Ex. 4.18, numbers 1, 5, and 8

Lesson 119**Pages Taught:**

Plane Geometry pp. 223–224

Teacher Instructions:

1. Homework Check.
(During HW check, students do Practice Exercise 93.)
2. Turn on the video.

Homework:

Page 224: Ex. 4.19, numbers 2 and 3
Page 225: Ex. 4.20, numbers 1 and 2

Lesson 120**Pages Taught:**

Plane Geometry pp. 225–226

Teacher Instructions:

1. Homework Check.
(During HW check, students do Practice Exercise 94.)
2. Turn on the video.

Homework:

Page 226: Ex. 4.22, numbers 1 and 3 (For number 3, do only the first part.)

Lesson 121**Pages Taught:**

Plane Geometry pp. 226–227

Materials Needed:

Quiz 36 and Quiz Key

Teacher Instructions:

1. Homework Check.
(During HW check, students do Practice Exercise 95.)
2. Give, grade, and collect **Quiz 36**.
3. Turn on the video.

Homework:

Page 227: Ex. 4.23, numbers 3, 4 (first part only), 5, and 8 (For problem 5, let the two lines have a ratio of 2:3).

Lesson 122**Pages Taught:**

Plane Geometry p. 229

Materials Needed:

Quiz 37 and Quiz Key

Teacher Instructions:

1. Homework Check.
(During HW check, students do Practice Exercise 96.)
2. Give, grade, and collect **Quiz 37**.
3. Turn on the video.

Homework:

Page 228: Ex. 4.24, numbers 1 and 2
Page 230: Ex. 4.26, number 10

Lesson 123**Pages Taught:***Plane Geometry* pp. 234–237**Teacher Instructions:**

- Homework Check.
(During HW check, students do *Practice Exercise 97*. Grade as **Practice Exercise Quiz 10**; after you have grades for *Practice Exercise Quizzes 10–12*, average the three grades and record the average as one regular quiz grade. Grading scale: 8 points off for each incorrect answer. Subtract points missed from 100.)
- Turn on the video.

Homework:

Pages 237–238: Ex. 5.2, numbers 2, 4, and 6

Lesson 124**Pages Taught:***Plane Geometry* pp. 238–239**Teacher Instructions:**

- Homework Check.
(During HW check, students do *Practice Exercise 98*.)
- Turn on the video.

Homework:

Page 240: Ex. 5.4, numbers 5–7 and 9

Lesson 125**Pages Taught:***Plane Geometry* pp. 239–240**Materials Needed:**

Quiz 38 and Quiz Key

Teacher Instructions:

- Homework Check.
(During HW check, students do *Practice Exercise 99*.)
- Give, grade, and collect **Quiz 38**.
- Turn on the video.

Homework:

Page 240: Ex. 5.4, numbers 1, 2, and 8

Lesson 126**Pages Taught:***Plane Geometry* p. 243**Teacher Instructions:**

- Homework Check.
(During HW check, students do *Practice Exercise 100*.)
- Turn on the video.

Homework:

Page 244: Ex. 5.6, numbers 1–3 and 5

Lesson 127**Pages Taught:***Plane Geometry* p. 244**Teacher Instructions:**

- Homework Check.
(During HW check, students do *Practice Exercise 101*.)
- Turn on the video.

Homework:

Page 244: Ex. 5.6, numbers 14, 15, 17, and 18

Lesson 128**Pages Taught:**

Review

Materials Needed:

Quiz 39 and Quiz Key

Teacher Instructions:

- Homework Check.
(During HW check, students do *Practice Exercise 102*.)
- Give, grade, and collect **Quiz 39**.
- Turn on the video.

Homework:Do constructions 14, 17, and 19 once each.
Page 244: Ex. 5.6, numbers 16 and 20

Lesson 129**Pages Taught:**

Review

Teacher Instructions:

1. Homework Check.
(During HW check, students do Practice Exercise 103.)
2. Turn on the video.

Homework:

Study for Test 9 over sections 3.20–5.6 in the next lesson.

Lesson 130**Materials Needed:**

Test 9 (Nine-Weeks Exam) and Test Key

Teacher Instructions:

1. There is no written homework to check.
2. There is no video today.
3. Announce the homework assignment.
4. Students clear their desks and take out test materials (two clean sheets of paper, one for a cover sheet and one for a check sheet, and two pencils) before tests are distributed.
5. Give **Test 9** (Nine-Weeks Exam) over sections 3.20–5.6. Collect and grade tests.
6. Plan to return graded Test 9 in les. 131.

Homework:

Read pp. 241–242.

Lesson 131**Pages Taught:**

Plane Geometry p. 245

Materials Needed:

Graded Test 9 (return to students) and Test Key

Teacher Instructions:

1. There is no written homework to check.
2. Hand back and go over graded Test 9. Collect tests and record grades.
3. Turn on the video.

Homework:

Page 247: Ex. 5.8, numbers 1–3

Lesson 132**Pages Taught:**

Plane Geometry pp. 246–249

Teacher Instructions:

1. Homework Check.
(During HW check, students do Practice Exercise 104.)
2. Turn on the video.

Homework:

Page 249: Ex. 5.9, numbers 3, 4, 7, and 8

Lesson 133**Pages Taught:**

Plane Geometry p. 250

Materials Needed:

Quiz 40 and Quiz Key

Teacher Instructions:

1. Homework Check.
(During HW check, students do Practice Exercise 105.)
2. Give, grade, and collect **Quiz 40**.
3. Turn on the video.

Homework:

Page 250: Ex. 5.10, numbers 1–3
Page 250: Ex. 5.11, numbers 4 and 5

Lesson 134**Pages Taught:**

Review

Teacher Instructions:

1. Homework Check.
(During HW check, students do Practice Exercise 106. Grade as **Practice Exercise Quiz 11**; after you have grades for Practice Exercise Quizzes 10–12, average the three grades and record the average as one regular quiz)

grade. Grading scale: 6 points off for each incorrect answer. Subtract points missed from 100.)

- Turn on the video.

Homework:

Page 252: Ex. 5.13, numbers 1–5

Lesson 135**Pages Taught:**

Plane Geometry p. 254

Materials Needed:

Quiz 41 and Quiz Key

Teacher Instructions:

- Homework Check.
(During HW check, students do Practice Exercise 107.)
- Give, grade, and collect **Quiz 41**.
- Turn on the video.

Homework:

Do Construction 21 one time.
Page 252: Ex. 5.13, numbers 6–8 and 15

Lesson 136**Pages Taught:**

Plane Geometry p. 254

Materials Needed:

Quiz 42 and Quiz Key

Teacher Instructions:

- Homework Check.
(During HW check, students do Practice Exercise 108.)
- Give, grade, and collect **Quiz 42**.
- Turn on the video.

Homework:

Pages 252–253: Ex. 5.13, numbers 16 and 18
Page 255: Ex. 5.15, number 3

Lesson 137**Pages Taught:**

Review

Materials Needed:

Quiz 43 and Quiz Key

Teacher Instructions:

- Homework Check.
(During HW check, students do Practice Exercise 109.)
- Give, grade, and collect **Quiz 43**.
- Turn on the video.

Homework:

Page 256: Ex. 5.16, numbers 2, 5, and 7

Lesson 138**Pages Taught:**

Plane Geometry pp. 256–257

Teacher Instructions:

- Homework Check.
(During HW check, students do Practice Exercise 110.)
- Turn on the video.

Homework:

Page 256: Ex. 5.16, numbers 8, 9, 13, and 14

Lesson 139**Pages Taught:**

Review

Materials Needed:

Quiz 44 and Quiz Key

Teacher Instructions:

- Homework Check.
(During HW check, students do Practice Exercise 111.)
- Give, grade, and collect **Quiz 44**.
- Turn on the video.

Homework:

Study for Test 10 over sections 5.7–5.17 in the next lesson.

Lesson 140**Materials Needed:**

Test 10 and Test Key

Teacher Instructions:

1. There is no written homework to check.
2. There is no video today.
3. Announce the homework assignment.
4. Students clear their desks and take out test materials (two clean sheets of paper, one for a cover sheet and one for a check sheet, and two pencils) before tests are distributed.
5. Give **Test 10** over sections 5.7–5.17. Collect and grade tests.
6. Plan to return graded Test 10 in les. 141.

Homework:

Read pp. 258 and 267.

Lesson 141**Pages Taught:**

Plane Geometry pp. 260–261

Materials Needed:

Graded Test 10 (return to students) and Test Key

Teacher Instructions:

1. There is no written homework to check.
2. Hand back and go over graded Test 10. Collect tests and record grades.
3. Turn on the video.

Homework:

Page 261: Ex. 6.1, numbers 2 and 4–7

Lesson 142**Pages Taught:**

Plane Geometry pp. 261–262

Teacher Instructions:

1. Homework Check.
(*During HW check, students do Practice Exercise 112.*)
2. Turn on the video.

Homework:

Page 263: Ex. 6.2, numbers 3, 4, 6, 8, and 9

Lesson 143**Pages Taught:**

Plane Geometry pp. 263–264

Teacher Instructions:

1. Homework Check.
(*During HW check, students do Practice Exercise 113.*)
2. Turn on the video.

Homework:

Page 264: Ex. 6.2, numbers 16 and 17

Lesson 144**Pages Taught:**

Plane Geometry pp. 264–265

Materials Needed:

Quiz 45 and Quiz Key

Teacher Instructions:

1. Homework Check.
(*During HW check, students do Practice Exercise 114.*)
2. Give, grade, and collect **Quiz 45**.
3. Turn on the video.

Homework:

Page 265: Ex. 6.3, numbers 2 and 3

Lesson 145**Pages Taught:**

Plane Geometry pp. 265–266

Teacher Instructions:

1. Homework Check.
(*During HW check, students do Practice Exercise 115.*)
2. Turn on the video.

Homework:

Page 266: Ex. 6.5, numbers 4, 5, and 7

Lesson **146****Pages Taught:**

Plane Geometry pp. 268–269

Teacher Instructions:

1. Homework Check.
(During HW check, students do *Practice Exercise 116*. Grade as **Practice Exercise Quiz 12**; after you have grades for *Practice Exercise Quizzes 10–12*, average the three grades and record the average as one regular quiz grade. Grading scale: 6 points off for each incorrect answer. Subtract points missed from 100.)
2. Turn on the video.

Homework:

Page 270: Ex. 6.6, numbers 1–17 (odd)

Lesson **147****Pages Taught:**

Plane Geometry pp. 270–271

Materials Needed:

Quiz 46 and Quiz Key

Teacher Instructions:

1. Homework Check.
(During HW check, students do *Practice Exercise 117*.)
2. Give, grade, and collect **Quiz 46**.
3. Turn on the video.

Homework:

Page 272: Ex. 6.7A, numbers 2–12 (even)

Lesson **148****Pages Taught:**

Plane Geometry pp. 271–272

Teacher Instructions:

1. Homework Check.
(During HW check, students do *Practice Exercise 118*.)
2. Turn on the video.

Homework:

Page 272: Ex. 6.7B, numbers 2 and 5–7

Lesson **149****Pages Taught:**

Plane Geometry p. 273

Teacher Instructions:

1. Homework Check.
(During HW check, students do *Practice Exercise 119*.)
2. Turn on the video.

Homework:

Page 273: Ex. 6.8, numbers 2–10 (even)

Lesson **150****Pages Taught:**

Plane Geometry p. 273

Materials Needed:

Quiz 47 and Quiz Key

Teacher Instructions:

1. Homework Check.
(During HW check, students do *Practice Exercise 120*.)
2. Give, grade, and collect **Quiz 47**.
3. Turn on the video.

Homework:

Page 273: Ex. 6.8, numbers 12–18 (even)

Lesson **151****Pages Taught:**

Plane Geometry p. 274

Teacher Instructions:

1. Homework Check.
(During HW check, students review sections 6.2–6.5 in the text.)
2. Turn on the video.

Homework:

Page 274: Ex. 6.8, numbers 20–28 (even)

Lesson 152**Pages Taught:***Plane Geometry* p. 274**Teacher Instructions:**

1. Homework Check.
(During HW check, students review section 6.6.)
2. Turn on the video.

Homework:

Page 274: Ex. 6.8, numbers 30, 32, 34, and 40

Lesson 153**Pages Taught:**

Review

Materials Needed:

Quiz 48 and Quiz Key

Teacher Instructions:

1. Homework Check.
(During HW check, students review sections 6.7–6.8.)
2. Give, grade, and collect **Quiz 48**.
3. Turn on the video.

Homework:

Study for Test 11 over sections 6.1–6.8 in the next lesson.

Lesson 154**Materials Needed:**

Test 11 and Test Key

Teacher Instructions:

1. There is no written homework to check.
2. There is no video today.
3. Announce the homework assignment.
4. Students clear their desks and take out test materials (two clean sheets of paper, one for a cover sheet and one for a check sheet, and two pencils) before tests are distributed.
5. Give **Test 11** over sections 6.1–6.8. Collect and grade tests.
6. Plan to return graded Test 11 in les. 155.

Homework:

Read pp. 281–282 and pp. 291–292.

Lesson 155**Pages Taught:***Plane Geometry* p. 275**Materials Needed:**

Graded Test 11 (return to students) and Test Key

Teacher Instructions:

1. There is no written homework to check.
2. Hand back and go over graded Test 11. Collect tests and record grades.
3. Turn on the video.

Homework:Page 275: Ex. 6.9, numbers 1, 4, 6, and 8
Do Construction 24 once.**Lesson 156****Pages Taught:***Plane Geometry* p. 275**Teacher Instructions:**

1. Homework Check.
(During HW check, students inscribe a square and a regular octagon in a circle.)
2. Turn on the video.

Homework:

Page 275: Ex. 6.9, numbers 16 and 17

Lesson 157**Pages Taught:***Plane Geometry* pp. 275–276**Teacher Instructions:**

1. Homework Check.
(During HW check, students review the 45-45-90 triangle relationship.)
2. Turn on the video.

Homework:

Page 276: Ex. 6.9, numbers 22, 23, and 27

Lesson **158****Pages Taught:***Plane Geometry* pp. 276–277**Teacher Instructions:**

1. Homework Check.
(During HW check, students review section 6.9.)
2. Turn on the video.

Homework:

Page 277: Ex. 6.11, numbers 1, 3, and 5
Practice Constructions 26 and 28 once each.

Lesson **159****Pages Taught:***Plane Geometry* p. 277**Teacher Instructions:**

1. Homework Check.
(During HW check, students inscribe a regular hexagon and an equilateral triangle in a circle.)
2. Turn on the video.

Homework:

Page 277: Ex. 6.11, numbers 7, 11, 13, 17, and 18
(For problems 17 and 18, only do the parts pertaining to numbers 7 and 13.)

Lesson **160****Pages Taught:***Plane Geometry* pp. 277–278**Teacher Instructions:**

1. Homework Check.
(During HW check, students review theorems 78 through 81 and their corollaries.)
2. Turn on the video.

Homework:

Pages 277–278: Ex. 6.11, numbers 20, 25, 27, 30, and 38
Pages 278–279: Ex. 6.13, numbers 3 and 10

Lesson **161****Pages Taught:***Plane Geometry* p. 279**Materials Needed:**

Quiz 49 and Quiz Key

Teacher Instructions:

1. Homework Check.
(During HW check, students review sections 6.9–6.11.)
2. Give, grade, and collect **Quiz 49**.
3. Turn on the video.

Homework:

Page 279: Ex. 6.14, number 7

Lesson **162****Pages Taught:***Plane Geometry* p. 280**Teacher Instructions:**

1. Homework Check.
(During HW check, students review sections 6.6–6.7.)
2. Turn on the video.

Homework:

Page 280: Ex. 6.15, numbers 10, 11, 14, and 15

Lesson **163****Pages Taught:***Plane Geometry* pp. 284–287**Teacher Instructions:**

1. Homework Check.
(During HW check, students review sections 6.10–6.11.)
2. Turn on the video.

Homework:

Page 287: Ex. 7.2, numbers 37, 38, and 40

Lesson **164****Pages Taught:***Plane Geometry* pp. 288–289**Materials Needed:**

Quiz 50 and Quiz Key

Teacher Instructions:

1. Homework Check.
(During HW check, students review sections 6.10–6.11.)
2. Give, grade, and collect **Quiz 50**.
3. Turn on the video.

Homework:

Page 289: Ex. 7.4, numbers 2, 7, 10, and 15

Lesson **165****Pages Taught:***Plane Geometry* pp. 289–290**Teacher Instructions:**

1. Homework Check.
(During HW check, students review the trigonometry relationships listed on p. 286.)
2. Turn on the video.

Note: Students will take Test 12 (Final Exam) in les. 170. Plan to allow 20–30 minutes extra for this exam. Students should not have more than two major exams in one day.

Homework:

Page 290: Ex. 7.4, numbers 20, 25, and 27

Lesson **166****Pages Taught:***Plane Geometry* pp. 293–294**Teacher Instructions:**

1. Homework Check.
(During HW check, students review pp. 301–306.)
2. Turn on the video.

Homework:

Pages 293–294: Review Les. 1, numbers 2–20 (even)

Lesson **167****Pages Taught:***Plane Geometry* pp. 294–295**Teacher Instructions:**

1. Homework Check.
(During HW check, students review pp. 307–313.)
2. Turn on the video.

Homework:

Pages 294–295: Review Les. 2, numbers 2–20 (even)

Lesson **168****Pages Taught:***Plane Geometry* pp. 295–296**Teacher Instructions:**

1. Homework Check.
(During HW check, students review pp. 314–319.)
2. Turn on the video.

Homework:

Pages 295–296: Review Les. 3, numbers 2–20 (even)

Lesson **169****Pages Taught:***Plane Geometry* pp. 295–296**Teacher Instructions:**

1. Homework Check.
(During HW check, students review pp. 320–321.)
2. Turn on the video.

Homework:

Study for Test 12 (Final Exam) over sections 1.1–6.15 in the next lesson.

Lesson 170

Materials Needed:

Test 12 (Final Exam) and Test Key

Teacher Instructions:

1. There is no written homework to check.
2. There is no video today.
3. Students clear their desks and take out test materials (two clean sheets of paper, one for a cover sheet and one for a check sheet, and two pencils) before tests are distributed.
4. Give **Test 12** (Final Exam) over sections 1.1–6.15. Collect and grade tests.

Note: Students will take Test 12 (Final Exam.) Plan to allow 20–30 minutes extra for students to take this exam. Students should not have more than two major exams in one day.

Congratulations!

We trust you had a successful and enjoyable school year. Please let us know how we can serve your commitment to Christian education in the future.

Sincerely,
the Abeka team

Plane Geometry

Appendix A

Plane Geometry Practice Exercises Answer Key
Practice Exercise Score Sheet

Appendix A

Plane Geometry Practice Exercises Answer Key

(See p. A35 for the Practice Exercise Score Sheet.)

Exercise 1

$6 + 9 + 4 + 7 + 3 + 8 = \underline{37}$	$23 + 76 + 59 + 36 = \underline{194}$	$9 + 47 + 16 + 5 + 48 = \underline{125}$
$148 + 69 + 893 + 7 = \underline{1,117}$	$706 + 845 + 19 + 358 = \underline{1,928}$	$45 + 19 + 689 + 683 = \underline{1,436}$
$5 + 8 + \underline{16} + 9 + 3 = 41$	$84 + \underline{18} + 32 + 19 = 153$	$\underline{75} + 689 + 436 = 1,200$
$115 - 98 = \underline{17}$	$1,895 - 793 = \underline{1,102}$	$700 - 516 = \underline{184}$

Exercise 2

$9 \times 8 = \underline{72}$	$12 \times 11 = \underline{132}$	$7 \times \underline{5} = 35$	$11 \times 6 = \underline{66}$	$\underline{9} \times 9 = 81$
$13 \times 7 = \underline{91}$	$56 \times 8 = \underline{448}$	$\underline{3} \times 67 = 201$	$10 \times 98 = \underline{980}$	$13 \times \underline{13} = 169$
$3,459 \times 9 = \underline{31,131}$	$458 \times 11 = \underline{5,038}$	$17 \times 15 = \underline{255}$	$65 \times 24 = \underline{1,560}$	$5,683 \times 8 = \underline{45,464}$
$63 \div 9 = \underline{7}$	$144 \div \underline{12} = 12$	$560 \div 10 = \underline{56}$	$312 \div 24 = \underline{13}$	$\underline{1,000} \div 4 = 250$

Exercise 3

(If the digit immediately to the right of the place being rounded is less than 5, leave the digit being rounded alone. If the digit to the right is 5 or more, add 1 to the digit being rounded. All digits to the right of the one being rounded become 0s.)

Round off to the nearest tens' place.

578 580	174 170	1,784 1,780	9,783 9,780
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Round off to the nearest hundreds' place.

4,893 4,900	8,955 9,000	7,834 7,800	35,759 35,800
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Round off to the nearest ten thousands' place.

1,784,785 1,780,000	78,899,674 78,900,000	90,746,784 90,750,000
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Round off the answer to the nearest ten dollars.

$\$45 \times 23$ $\\$1,040$	$\$23 + \$67 + \$99$ $\\$190$	$\$3,531 - \477 $\\$3,050$
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Exercise 4

(Remember that a raised dot indicates multiplication. A fraction bar indicates division.)

$16 \cdot 5 = \underline{80}$	$79 + 346 + 789 + 32 = \underline{1,246}$	$\$234 - \$86 = \underline{\$148}$	$694 \cdot 78 = \underline{54,132}$
$\frac{210}{30} = \underline{7}$	$\underline{9} \cdot 12 = 108$	$\frac{63}{7} = 9$	$9 + 57 + 247 + 69 = \underline{382}$

Round off to the digit that is bold.

5,8 9 4 5,900	6 4 ,845 60,000	48, 2 96 48,300	1, 1 78,567 1,200,000
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Exercise 5 (quiz—8 each)

Robert E. Lee had an army of about 75,000 men at the Battle of Gettysburg. To what place is 75,000 rounded? *one thousand*

George Meade led the Union army of about 90,000 at the Battle of Gettysburg. How many more Union soldiers than Confederate soldiers were there? *15,000*

$$\begin{array}{r} 90,000 \\ - 75,000 \\ \hline 15,000 \end{array}$$

Gen. Lee had about 20 thousand casualties, and Gen. Meade had about 18 thousand. How many more Union soldiers than Confederate soldiers were there at the end of the Battle of Gettysburg? *17,000*

$$\begin{array}{r} 72,000 \\ - 55,000 \\ \hline 17,000 \end{array}$$

$7 + 8 + 9 + 4 + 6 = 34$

$32 + 28 + 76 = 136$

$132 - 17 = 115$

$9 \times 7 = 63$

$27 \times 9 = 243$

$300 - 21 = 279$

$96 \div 12 = 8$

$320 \div 10 = 32$

$200 - 74 + 56 = 182$

Exercise 6

(Solve within parentheses first. Do multiplication and division in the order they appear. Do addition and subtraction last.)

$(12 + 6) \times 5 = 90$

$5 \times (6 + 2) - 5 = 35$

$12 \div 4 \times 2 - 3 = 3$

$\frac{25}{5} + 8 \times 3 = 29$

$7 \cdot 2 \cdot 5 \div 10 + 4 = 11$

$16 + 4 \div 4 \times 6 - 3 = 19$

$12 \times (5 + 4) \div 2 = 54$

$(16 - 9) \cdot 5 + 35 = 70$

$\frac{20}{5} \cdot 4 - 7 + 6 - 9 = 6$

Exercise 7

(Division by primes is a good method to find prime factors.)

Write the prime factors.

$25 \ 5 \times 5$

$42 \ 2 \times 3 \times 7$

$56 \ 2 \times 2 \times 2 \times 7$

$12 \ 2 \times 2 \times 3$

$240 \ 2 \times 2 \times 2 \times 2 \times 3 \times 5$

$510 \ 2 \times 3 \times 5 \times 17$

$225 \ 3 \times 3 \times 5 \times 5$

$840 \ 2 \times 2 \times 2 \times 3 \times 5 \times 7$

Exercise 8

Write the greatest common factor (gcf) for each set of numbers after the prime factors are found.

$24; 60; 84 \ 12$

$45; 150; 175 \ 5$

$15; 20 \ 5$

$12; 36; 72 \ 12$

$16; 30 \ 2$

$18; 24; 36 \ 6$

$50; 110; 210 \ 10$

$9; 15; 27 \ 3$

Exercise 9

(Divide both terms by the gcf to reduce a fraction to lowest terms.)

Reduce to lowest terms.

$\frac{18}{24} \ \frac{3}{4}$

$\frac{68}{102} \ \frac{2}{3}$

$\frac{24}{36} \ \frac{2}{3}$

$\frac{378}{462} \ \frac{9}{11}$

$\frac{28}{144} \ \frac{7}{36}$

$\frac{110}{176} \ \frac{5}{8}$

$\frac{81}{135} \ \frac{3}{5}$

$\frac{16}{40} \ \frac{2}{5}$

Exercise 10

The odometer on Missy's car read 23,678 before her trip. After the trip, it read 25,127. How many miles was her trip? Round off the answer to the nearest ten miles. *1,450*

$$\begin{array}{r} 25,127 \\ -23,678 \\ \hline 1,449 \end{array}$$

The speedometer of a car should be lubricated every 16,000 kilometers. (A) How many times should the speedometer have been lubricated if the car has 68 thousand kilometers? (B) After how many more kilometers should the speedometer be lubricated again? (A) 4 (B) 12,000

$$\begin{array}{r} (A) \quad 4 \\ 16 \overline{)68} \\ \underline{-64} \\ 4 \end{array}$$

$$(B) \quad 16,000 \\ \underline{-4,000} \\ 12,000$$

One city has a policy to give speeders a ticket at the rate of \$29 per mile traveled above the speed limit. When Missy passed through this city she was caught speeding. The officer said that she was going 43 mph in a 35 mph zone. How much was her ticket? *\$232*

$$\begin{array}{r} 43 \quad \$29 \\ -35 \quad \times 8 \\ \hline 8 \quad \$232 \end{array}$$

Exercise 11

Write the least common multiple (lcm) for each set of numbers after the prime factors are found.

6; 8; 12 *24*

3; 4; 5 *60*

8; 12; 18 *72*

6; 9; 15 *90*

12; 15; 18 *180*

8; 24; 40 *120*

2; 3; 4 *12*

5; 10; 25 *50*

Exercise 12

Write the least common denominator for each set of fractions.

$\frac{2}{15}, \frac{3}{5}, \frac{2}{3}$ *15*

$\frac{7}{24}, \frac{2}{3}, \frac{3}{16}$ *48*

$\frac{9}{10}, \frac{5}{6}$ *30*

$\frac{3}{4}, \frac{5}{8}, \frac{3}{5}$ *40*

$\frac{27}{42}, \frac{3}{4}, \frac{6}{7}$ *84*

$\frac{1}{4}, \frac{1}{5}, \frac{1}{6}$ *60*

$\frac{2}{5}, \frac{7}{8}, \frac{1}{3}$ *120*

$\frac{1}{4}, \frac{2}{7}$ *28*

Exercise 13

(The greater the denominator of a unit fraction, the less the value.)

Order the fractions from least to greatest.

$\frac{1}{2}, \frac{1}{5}, \frac{3}{8}, \frac{1}{3}$

$\frac{1}{5}, \frac{1}{3}, \frac{3}{8}, \frac{1}{2}$

$\frac{1}{6}, \frac{3}{4}, \frac{1}{9}, \frac{1}{5}$

$\frac{1}{9}, \frac{1}{6}, \frac{1}{5}, \frac{3}{4}$

$\frac{2}{7}, \frac{5}{7}, \frac{1}{7}, \frac{8}{7}$

$\frac{1}{7}, \frac{2}{7}, \frac{5}{7}, \frac{8}{7}$

$\frac{1}{4}, \frac{5}{8}, \frac{2}{3}, \frac{1}{8}$

$\frac{1}{8}, \frac{1}{4}, \frac{5}{8}, \frac{2}{3}$

$\frac{1}{4}, \frac{1}{8}, \frac{1}{2}, \frac{1}{6}$

$\frac{1}{8}, \frac{1}{6}, \frac{1}{4}, \frac{1}{2}$

$\frac{3}{8}, \frac{5}{6}, \frac{1}{4}, \frac{1}{2}$

$\frac{1}{4}, \frac{3}{8}, \frac{1}{2}, \frac{5}{6}$

$\frac{3}{4}, \frac{7}{8}, \frac{2}{3}, \frac{5}{6}$

$\frac{2}{3}, \frac{3}{4}, \frac{5}{6}, \frac{7}{8}$

$\frac{5}{8}, \frac{1}{5}, \frac{1}{9}, \frac{1}{6}$

$\frac{1}{9}, \frac{1}{6}, \frac{1}{5}, \frac{5}{8}$

Exercise 14 (quiz—9 each)

$3,000 - 478 = 2,522$ $578 \times 63 = 36,414$ $30,444 \div 86 = 354$

Round off to the digit that is bold.

$9,374$ $9,400$ $89,247$ $90,000$ $453,285$ $453,290$ $3,958,105$ $4,000,000$

Reduce to lowest terms.

$\frac{12}{18} \frac{2}{3}$ $\frac{48}{60} \frac{4}{5}$ $\frac{120}{150} \frac{4}{5}$ $\frac{128}{200} \frac{16}{25}$

Exercise 15

Betelgeuse, a supergiant star, has a diameter that is 330 times the diameter of the sun. The diameter of the sun is 865,000 miles. Find the diameter of Betelgeuse. *285,450,000 mi.*

$$\begin{array}{r} 865,000 \\ \times 330 \\ \hline 25950000 \\ +2595000 \\ \hline 285,450,000 \end{array}$$

The smallest white star has a diameter of 5,200 miles. To the nearest whole number, how many times will this small star fit inside the sun? *166*

$$\begin{array}{r} 865,000 \\ 5,200 \overline{)8650} \\ \underline{52} \\ 345 \end{array}$$

Light travels at a speed of 186,282 miles per second. Round off its speed to the nearest ten thousand miles. *190,000 mps*

$$\begin{array}{r} 345 \\ -312 \\ \hline 330 \\ -312 \\ \hline 18 \end{array}$$

The temperature of a red star is about 5,000 °F. The temperature of a blue star is about 50,000 °F. How many times hotter is a blue star than a red star? *10*

$$\begin{array}{r} 50,000 \\ 5,000 \overline{)50,000} \\ \hline 10 \end{array}$$

Exercise 16

(Fractions must have a common denominator to be added or subtracted.)

$\frac{3}{4} + \frac{2}{3} + \frac{1}{6} = 1\frac{7}{12}$ $5\frac{3}{5} + 16\frac{1}{2} + 8\frac{1}{4} = 30\frac{7}{20}$ $15\frac{5}{9} + 3\frac{2}{9} + 2\frac{5}{9} = 21\frac{1}{3}$
 $5\frac{1}{2} + 7\frac{3}{4} + 18\frac{5}{6} = 32\frac{1}{12}$ $14\frac{3}{8} + 7\frac{5}{6} + 2\frac{5}{12} = 24\frac{5}{8}$ $9\frac{3}{8} + 7\frac{1}{4} + 12\frac{1}{2} = 29\frac{1}{8}$

Exercise 17

$\frac{11}{12} - \frac{7}{15} = \frac{9}{20}$ $\frac{8}{9} - \frac{2}{3} = \frac{2}{9}$ $23\frac{5}{9} - 16\frac{3}{5} = 6\frac{43}{45}$
 $1\frac{1}{2} - \frac{3}{4} = \frac{3}{4}$ $12\frac{3}{8} - 8\frac{5}{6} = 3\frac{13}{24}$ $10\frac{5}{9} - 7\frac{2}{3} = 2\frac{8}{9}$

Exercise 18

(Cancel common factors before multiplying when possible.)

$$\frac{7}{8} \times \frac{4}{5} = \frac{7}{10}$$

$$\frac{17}{20} \times \frac{4}{9} = \frac{17}{45}$$

$$\frac{2}{3} \times \frac{4}{15} = \frac{8}{45}$$

$$\frac{9}{11} \times \frac{7}{12} = \frac{21}{44}$$

$$10 \times \frac{2}{9} = 2\frac{2}{9}$$

$$\frac{5}{8} \times 12 = 7\frac{1}{2}$$

$$\frac{7}{9} \times 15 = 11\frac{2}{3}$$

$$24 \times \frac{11}{12} = 22$$

$$\frac{2}{3} \times 1\frac{1}{2} = 1$$

$$\frac{5}{8} \times 3\frac{1}{5} = 2$$

$$9 \times 4\frac{1}{5} = 37\frac{4}{5}$$

$$2\frac{4}{9} \times 12 = 29\frac{1}{3}$$

$$1\frac{1}{3} \times \frac{5}{6} = 1\frac{1}{9}$$

$$\frac{1}{4} \times 2\frac{2}{3} = \frac{2}{3}$$

$$2\frac{3}{5} \times \frac{5}{6} = 2\frac{1}{6}$$

$$\frac{5}{6} \times 3\frac{1}{3} = 2\frac{7}{9}$$

$$3\frac{1}{3} \times 2\frac{1}{2} = 8\frac{1}{3}$$

$$2\frac{3}{4} \times 1\frac{1}{3} = 3\frac{2}{3}$$

$$3\frac{2}{3} \times 2\frac{1}{5} = 8\frac{1}{15}$$

$$2\frac{7}{8} \times 4\frac{3}{5} = 13\frac{9}{40}$$

Exercise 19

$$\frac{3}{5} \div \frac{9}{10} = \frac{2}{3}$$

$$\frac{6}{7} \div \frac{3}{4} = 1\frac{1}{7}$$

$$12 \div \frac{2}{9} = 54$$

$$\frac{3}{4} \div 15 = \frac{1}{20}$$

$$\frac{3}{8} \div 10 = \frac{3}{80}$$

$$12 \div \frac{1}{2} = 24$$

$$\frac{4}{5} \div \frac{15}{16} = \frac{64}{75}$$

$$\frac{9}{11} \div \frac{2}{3} = 1\frac{5}{22}$$

$$1\frac{1}{3} \div 5 = \frac{4}{15}$$

$$\frac{7}{8} \div 16 = \frac{7}{128}$$

$$12\frac{1}{2} \div \frac{3}{5} = 20\frac{5}{6}$$

$$1\frac{3}{5} \div 2\frac{2}{7} = \frac{7}{10}$$

Exercise 20

Jordan feeds her dog $4\frac{1}{3}$ cups of dry dog food each day. She gives $2\frac{1}{2}$ cups in the morning and the rest in the evening. How many cups of dog food does she give her dog in the evening?

$$1\frac{5}{6} \text{ c.}$$

$$\begin{aligned} 4\frac{1}{3} &= 4\frac{2}{6} = 3\frac{8}{6} \\ -2\frac{1}{2} &= -2\frac{3}{6} = -2\frac{3}{6} \\ \hline &1\frac{5}{6} \text{ c.} \end{aligned}$$

A bag of dog food lasts Jordan's dog 12 days. How many cups of dog food does the bag contain? 52 c.

$$\begin{aligned} 4\frac{1}{3} \times 12 \\ \frac{13}{1} \times \frac{12}{1} = 52 \text{ c.} \end{aligned}$$

Mike's dog eats 2 cups less than twice as much as Jordan's dog. How many cups of dog food does Mike's dog eat each day?

$$6\frac{2}{3} \text{ c.}$$

$$\begin{aligned} 4\frac{1}{3} \times 2 \\ \frac{13}{3} \times \frac{2}{1} = \frac{26}{3} = 8\frac{2}{3} - 2 = 6\frac{2}{3} \text{ c.} \end{aligned}$$

Mike's dog weighs $61\frac{1}{2}$ pounds. Jordan's dog weighs $48\frac{7}{8}$ pounds. How many more pounds does Mike's dog weigh than Jordan's dog?

$$12\frac{5}{8} \text{ lb.}$$

$$\begin{aligned} 61\frac{1}{2} &= 61\frac{4}{8} = 60\frac{12}{8} \\ -48\frac{7}{8} &= -48\frac{7}{8} = -48\frac{7}{8} \\ \hline &12\frac{5}{8} \text{ lb.} \end{aligned}$$

Exercise 21

(Remember, only like place values may be added or subtracted. For instance, tenths can be added only to tenths.)

$$135.7 + 423.9 = 559.6$$

$$123.89 + 79.95 = 203.84$$

$$45.097 - 7.895 = 37.202$$

$$5.6 - 4.2 = 1.4$$

$$6.09 - 3.896 = 2.194$$

$$34.896 + 5.7 + 2.367 = 42.963$$

$$2.467 + 6.7 - 1.56 = 7.607$$

$$13.907 - 7.89 + 5.789 = 11.806$$

$$2.786 + 8.905 + 4.7 = 16.391$$

Exercise 22

Round to the nearest tenth.

.8943 *.9* 2.854 *2.9* 16.7334 *16.7* 4.801 *4.8*

Round to the nearest cent.

\$.907 *\$.91* \$16.473 *\$16.47* \$3.995 *\$4.00* \$50.947 *\$50.95*

Round the answer to the nearest tenth.

$27.893 + 8.6 - 2.55 = 33.9$ $45.983 - .8674 + 159.7 = 204.8$ $23.895 + .37 + 56.9 = 81.2$

Exercise 23

(The product has as many decimal places as the factors combined. To multiply by a positive power of 10, move the decimal point to the right as many places as there are 0s in the power of 10.)

$8.165 \times .3 = 2.4495$ $2.79 \times .001 = .00279$ $19.254 \times .8 = 15.4032$
 $.56 \times 2.5 = 1.4$ $1.386 \times 100 = 138.6$ $1,000 \times 5.8943 = 5,894.3$

Round the answer to the nearest cent.

$\$5.254 \times .3 = \1.58 $\$17.894 \times 15 = \268.41 $67.9¢ \times .61 = \$41$ or $41¢$

Exercise 24

(To divide by a positive power of 10, move the decimal point to the left as many places as there are 0s in the power of 10. If the divisor has a decimal, multiply both terms by the power of 10 that eliminates the decimal from the divisor.)

$.087 \div 100 = .00087$ $2.457 \div 10 = .2457$ $.918 \div 3.4 = .27$
 $2.24 \div .04 = 56$ $247 \div 32.5 = 7.6$ $.0287 \div .007 = 4.1$

Round the answer to the nearest tenth of a cent.

$\$5.20 \div 3 = \1.73 $\$12.88 \div 11 = \1.17 $\$.76 \div 7 = \$.11$

Exercise 25

George Mikan, who played for the Lakers from 1947 to 1956, scored 11,764 points. If this was an average of 22.6 points per game, find the number of games he played for the Lakers to the nearest whole game.
521

$$22.6 \overline{) 11,764.00} = 521$$

While playing for the Chicago Bulls during the 1986 to 1987 season, Michael Jordan scored an average of 37.1 points per game. How many more points per game did he average than George Mikan?
14.5

$$\begin{array}{r} 37.1 \\ -22.6 \\ \hline 14.5 \end{array}$$

George Mikan was 208 centimeters tall. If 1 cm equals .39 in., find his height in feet and inches. Find the inches to the nearest whole inch. (1 ft. = 12 in.) *6 ft. 9 in.*

$$\begin{array}{r} 208 \\ \times .39 \\ \hline 1872 \\ +624 \\ \hline 81.12 \end{array}$$

$$\begin{array}{r} 12 \\ \overline{) 81.12} \\ \underline{72} \\ 912 \\ \underline{84} \\ 72 \end{array}$$

Michael Jordan is 6 ft. 6 in. tall. If 1 in. equals 2.54 cm, find his height in centimeters. Find the answer to the nearest whole centimeter.
198 cm

$$12 \times 6 = 72$$

$$\begin{array}{r} 2.54 \\ \times 6 \\ \hline 15.24 \\ +78 \\ \hline 177.8 \\ \hline 198.12 \end{array}$$

Exercise 26

$$68\frac{3}{14} - 33\frac{1}{42} = 35\frac{4}{21} \quad 12\frac{3}{5} + 92\frac{1}{2} + 63\frac{3}{4} = 168\frac{17}{20} \quad 31\frac{1}{2} \div \frac{3}{4} = 42$$

$$5\frac{6}{7} \times \frac{14}{41} = 2 \quad 444.54 \div 23.9 = 18.6 \quad 46.5 - 39.732 = 6.768$$

$$34.6 \times .005 = .173 \quad 3.45 + 3.896 + 236.89 = 244.236 \quad 4,783.2 \div 1,000 = 4.7832$$

Exercise 27 (quiz—8 each)

$$5\frac{3}{8} + 7\frac{5}{12} = 12\frac{19}{24} \quad 11\frac{4}{9} - 7\frac{2}{3} = 3\frac{7}{9} \quad 1\frac{1}{2} \div \frac{3}{4} = 2$$

$$.07 \times .63 = .0441 \quad 6\frac{2}{5} \times \frac{15}{16} = 6 \quad 4.78 + 2.64 + 7.995 = 15.415$$

$$34.6 \div 10 = 3.46 \quad 3.06 - 1.7328 = 1.3272 \quad 176.8 \div 5.2 = 34$$

$$10 - \frac{1}{2} = 9\frac{1}{2} \quad 3\frac{2}{3} + 1\frac{1}{4} = 4\frac{11}{12} \quad 1\frac{1}{4} \times 8 = 10$$

Exercise 28

(To convert from a larger unit to a smaller unit, multiply by the number of smaller units in 1 larger unit. To convert from a smaller unit to a larger unit, divide.)

$$40 \text{ ft.} = \underline{480} \text{ in.} \quad 612 \text{ fl. oz.} = \underline{76\frac{1}{2}} \text{ c.} \quad 53 \text{ da.} = \underline{7\frac{4}{7}} \text{ wk.} \quad 5.4 \text{ mi.} = \underline{28,512} \text{ ft.}$$

$$8.8 \text{ lb.} = \underline{140.8} \text{ oz.} \quad 36 \text{ qt.} = \underline{9} \text{ gal.} \quad 5\frac{3}{4} \text{ yr.} = \underline{69} \text{ mo.} \quad 9 \text{ tbsp.} = \underline{27} \text{ tsp.}$$

Round the answer to the nearest tenth.

$$133 \text{ min.} = \underline{2.2} \text{ hr.} \quad 27 \text{ in.} = \underline{2.3} \text{ ft.} \quad 300 \text{ fl. oz.} = \underline{9.4} \text{ qt.} \quad 520 \text{ oz.} = \underline{32.5} \text{ lb.}$$

Exercise 29

(Since the metric system is based upon 10, multiply or divide by moving the decimal point to the right or left.)

$$9.8 \text{ kl} = \underline{98,000} \text{ dl} \quad 5,000 \text{ g} = \underline{500} \text{ dg} \quad 514 \text{ hm} = \underline{51.4} \text{ km} \quad 90 \text{ cm} = \underline{900} \text{ mm}$$

$$7,193 \text{ mg} = \underline{.07193} \text{ hg} \quad 52 \text{ m} = \underline{5,200} \text{ cm} \quad 2,250 \text{ m} = \underline{2.25} \text{ km} \quad 0.8 \text{ kg} = \underline{80,000} \text{ cg}$$

Exercise 30

A migrating duck can fly about 11,000 kilometers per week.

Find the average number of meters per day the migrating duck can fly. Round to the nearest whole meter.

$$1,571,429 \text{ m}$$

Car A leaves a destination at 3 P.M. and travels 60 kph. Car B leaves the same destination and travels the same route as Car A at 4 P.M. and travels 70 kph. At what time will Car B catch up to Car A? *10:00 P.M.*

$$\begin{array}{r} 1,571,4285 = 1,571,429 \text{ m} \\ 7 \overline{) 11,000.0000} \end{array}$$

	Car A	Car B
4 P.M.	60 km	
5 P.M.	120 km	70 km
6 P.M.	180 km	140 km
7 P.M.	240 km	210 km
8 P.M.	300 km	280 km
9 P.M.	360 km	350 km
10 P.M.	420 km	420 km

A horse ran at the rate of 900 ft./min. At that rate, how many miles to the nearest whole mile did the horse run in 1 hour?

$$10 \text{ mph}$$

$$\begin{array}{r} 900 \\ \times 60 \\ \hline 54,000 \text{ ft. / hr.} \end{array}$$

$$\frac{54,000}{5,280} = \frac{1,350}{132} = \frac{675}{66} = \frac{225}{22} \quad 22 \overline{) 10.2} = 10 \text{ mi.}$$

Exercise 31

Write each fraction as a decimal. If necessary, round to the nearest thousandth.

$$\frac{798}{1,000} .798 \quad \frac{5}{8} .625 \quad 29\frac{3}{4} 29.75 \quad \frac{69}{217} .318 \quad 89\frac{1}{8} 89.125 \quad \frac{25}{100} .25$$

$$\frac{723}{14,681} .049 \quad 103\frac{1}{2} 103.5 \quad \frac{24}{47} .511 \quad \frac{284}{10,000} .028 \quad \frac{5}{6} .833 \quad \frac{1}{9} .111$$

Exercise 32

Write each decimal as a fraction in lowest terms.

$$.875 \frac{7}{8} \quad .75 \frac{3}{4} \quad .938 \frac{469}{500} \quad .125 \frac{1}{8} \quad .25 \frac{1}{4} \quad .818 \frac{409}{500}$$

$$.35 \frac{7}{20} \quad .465 \frac{93}{200} \quad .52 \frac{13}{25} \quad .8 \frac{4}{5} \quad .545 \frac{109}{200} \quad .382 \frac{191}{500}$$

Exercise 33

(To write a percent as a decimal, move the decimal point 2 places to the left and delete the percent sign.)

Write each percent as a decimal.

$$61\% .61 \quad 3\% .03 \quad 6\frac{1}{2}\% .065 \quad 568\% 5.68 \quad \frac{3}{4}\% .0075 \quad 456\frac{7}{8}\% 4.56875$$

(To write a decimal as a percent, move the decimal point 2 places to the right and use the percent sign.)

Write each decimal as a percent.

$$.35 35\% \quad .007 .7\% \quad 4.5 450\% \quad .745 74.5\% \quad .0003 .03\% \quad 25.4 2,540\%$$

Write each percent as a fraction in lowest terms.

$$25\% \frac{1}{4} \quad 33\frac{1}{3}\% \frac{1}{3} \quad 16\frac{1}{6}\% \frac{1}{6} \quad 37\frac{1}{2}\% \frac{3}{8} \quad 40\% \frac{2}{5} \quad 50\% \frac{1}{2}$$

Exercise 34

Estimate the answer by rounding the terms to the nearest whole numbers. Answers should be rounded to nearest whole number also.

$$13.23 \times 5.9 = 78 \quad \$799.85 \times 9.1 = \$7,200 \quad 572.9 \times 5.2 \times 7.9 = 22,920$$

$$2,351.11 \div 9.9 = 235 \quad \$399.99 \div 0.87 = \$400 \quad 24.91 \div 5.06 \times 19.86 = 100$$

$$5.2 \times 6.9 \times 3.8 = 140 \quad 27.8 \div 3.9 = 7 \quad 631.2 \times 9.999 \div 99.9 = 63$$

Exercise 35

How many fluid ounces of fruit juice are in a punch containing 8 + 16 + 64 + 6 = 94 fl. oz.
1 cup of lemon juice, 1 pint of pineapple juice, 2 quarts of orange juice, and $\frac{3}{4}$ cup of grapefruit juice? 94 fl. oz.

Mrs. Nelson bought 5 packages of chips. Each bag contained 14 oz.
What was the total weight of the 5 bags? Give your answer in pounds and ounces. 4 lb. 6 oz.

$$\begin{array}{r} 14 \text{ oz.} \\ \times 5 \\ \hline 70 \text{ oz.} \end{array} \qquad \begin{array}{r} \frac{4}{4} = 4 \text{ lb. } 6 \text{ oz.} \\ 16 \overline{) 70} \\ \underline{-64} \\ 6 \end{array}$$

A package of 16 hot dogs weighs 2 lb. 8 oz. What is the weight of each hot dog? Give your answer in ounces. 2.5 oz.

$$\begin{array}{r} 0 \text{ lb. } 2.5 \text{ oz.} \\ 16 \overline{) 2 \text{ lb. } 8 \text{ oz.}} \\ \underline{+32} \\ 40 \text{ oz.} \\ \underline{-32} \\ 80 \\ \underline{-80} \end{array}$$

Jenny invited 64 students to her fall party. Five-eighths of the students were able to come. If Jenny supplied 20 fluid ounces of fruit punch for each student who came, how many quarts of drink did she need?
25 qt.

$$\begin{array}{r} \frac{5}{8} \times \frac{64}{1} = 40 \\ \times 20 \\ \hline 800 \text{ fl. oz.} \end{array} \qquad \begin{array}{r} 40 \\ \times 20 \\ \hline 800 \end{array} \qquad \begin{array}{r} 32 \overline{) 800} \\ \underline{25} \\ 25 \text{ qt.} \end{array}$$

Exercise 36

(To find a percentage, multiply the base by the percent written as a decimal.)

$$6\% \text{ of } 810 = 48.6 \qquad 25\% \text{ of } 440 = 110 \qquad 85\% \text{ of } 90 = 76.5$$

$$1\frac{1}{2}\% \text{ of } 750 = 11.25 \qquad 225\% \text{ of } 60 = 135 \qquad \frac{3}{4}\% \text{ of } 975 = 7.3125$$

$$\frac{4}{5}\% \text{ of } 600 = 4.8 \qquad 15\% \text{ of } \$26.50 = \$3.98 \qquad 33\frac{1}{3}\% \text{ of } 120 = 40$$

Exercise 37

(To find a percent, divide the percentage by the base.)

If necessary, round to the nearest whole percent.

$$12 \text{ is what } \% \text{ of } 48? \ 25\% \qquad 200 \text{ is what } \% \text{ of } 450? \ 44\% \qquad 75 \text{ is what } \% \text{ of } 120? \ 63\%$$

$$3 \text{ is what } \% \text{ of } 21? \ 14\% \qquad 22 \text{ is what } \% \text{ of } 77? \ 29\% \qquad 15 \text{ is what } \% \text{ of } 90? \ 17\%$$

$$43 \text{ is what } \% \text{ of } 78? \ 55\% \qquad 85 \text{ is what } \% \text{ of } 100? \ 85\% \qquad 5 \text{ is what } \% \text{ of } 20? \ 25\%$$

Exercise 38

(To find the base, divide the percentage by the percent written as a decimal.)

$$16 \text{ is } 8\% \text{ of what number? } 200 \qquad 30 \text{ is } 60\% \text{ of what number? } 50$$

$$9 \text{ is } 15\% \text{ of what number? } 60 \qquad 21 \text{ is } 10\frac{1}{2}\% \text{ of what number? } 200$$

$$6 \text{ is } 50\% \text{ of what number? } 12 \qquad 127 \text{ is } 25\% \text{ of what number? } 508$$

Exercise 39 (quiz—8 each)

$$9\frac{1}{4}\% \text{ of } 50 = 4.625 \qquad 11 \text{ is } 5\% \text{ of what number? } 220 \qquad 60 \text{ is } 120\% \text{ of what number? } 50$$

$$14 \text{ is what } \% \text{ of } 28? \ 50\% \qquad 16\frac{1}{2}\% \text{ of } 80 = 13.2 \qquad 25 \text{ is what } \% \text{ of } 1,000? \ 2.5\%$$

$$19\% \text{ of } \$650 = \$123.50 \qquad 5\frac{1}{5}\% \text{ of } \$750 = \$39 \qquad \frac{3}{8}\% \text{ of } 2,000 = 7.5$$

$$5\% \text{ of } \$800 = \$40 \qquad 10\% \text{ of } \$550 = \$55 \qquad 25\% \text{ of } \$100 = \$25$$

Exercise 40

The driver of an empty bus picks up 7 passengers at the first stop, drops off 3 passengers at the second stop, picks up 7 at the third stop, and drops off 3 at the fourth stop. If she continues in this same manner for twenty stops, how many passengers are on the bus after the 20th stop? (The answer is found quickly if you notice that there are 4 additional passengers after every 2 stops and you decide how many groups of 2 are in 20.) 40

$$4 \times 10 = 40$$

The driver of the bus filled the gas tank with gas by putting in 21 gallons. If the gas gauge was at five-eighths before she filled the tank, how many gallons does the tank hold? 56 gal.

$$1 - \frac{5}{8} = \frac{3}{8}$$

$$21 \div \frac{3}{8}$$

$$\frac{7 \cancel{2}1}{1} \times \frac{8}{\cancel{3}} = 56 \text{ gal.}$$

On Wednesday, the bus transported a total of 420 passengers. This number was 120% of the number of passengers who were transported on Tuesday. How many passengers were transported on Tuesday? 350

420 is 120% of what

$$\frac{420}{1.2} = \frac{4200}{12} = \frac{2100}{6} = 350$$

Mrs. Herr, the bus driver, received a pay rate of \$8.70 per hour until she received a pay raise, which gave her \$9.15 per hour. Find her percent of increase to the nearest whole percent. 5%

$$\frac{\$9.15}{\$8.70} = \frac{915}{870} = \frac{9}{87} = \frac{3}{29}$$

$$\frac{3}{29} \approx 0.1034 \approx 10.34\%$$

$$10.34\% - 5\% = 5.34\% \approx 5\%$$

Exercise 41

$$1,599 + 528 + 88 + 295 = \underline{2,510} \quad 985 + 3,996 + 78 + 957 = \underline{6,016} \quad 785 + \underline{619} + 78 + 413 = 1,895$$

$$5,000 - 489 + 596 = \underline{5,107} \quad 2,895 - 999 + 3,895 = \underline{5,791} \quad 34 - 23 + 79 - 16 = \underline{74}$$

$$89 \times 9 = \underline{801} \quad 6,895 \times 8 = \underline{55,160} \quad \underline{6} \times 55 = 330 \quad 10 \times 76 = \underline{760} \quad 25 \times \underline{15} = 375$$

$$108 \div 9 = \underline{12} \quad 121 \div \underline{11} = 11 \quad 3,870 \div 10 = \underline{387} \quad 864 \div 36 = \underline{24} \quad \underline{1,458} \div 9 = 162$$

Round the answer to the nearest ten thousand.

$$50,000 - 3,782 = 50,000 \quad 13,784 + 46,783 + 78,998 = 140,000 \quad 578 \times 483 = 280,000$$

Exercise 42

$$2\frac{5}{9} + 7\frac{5}{6} + 3\frac{1}{3} = 13\frac{13}{18}$$

$$11\frac{1}{4} - 6\frac{2}{5} = 4\frac{17}{20}$$

$$4\frac{2}{3} \times \frac{3}{7} = 2$$

$$.079 \times .505 = .039895$$

$$1\frac{1}{5} \times 15 = 18$$

$$0.895 + 1.857 - 0.99 = 1.762$$

$$89.56 \div 100 = .8956$$

$$6.94 - 3.8857 = 3.0543$$

$$24.702 \div 3.58 = 6.9$$

$$25 - 12\frac{3}{8} = 12\frac{5}{8}$$

$$7\frac{3}{8} \times 200 = 1,475$$

$$1\frac{1}{5} \div 15 = \frac{2}{25}$$

Exercise 43 (quiz—8 each)

$$.965 + 1.895 = 2.86$$

$$2.3 - 0.895 = 1.405$$

$$5.6 \times .008 = .0448$$

$$56.8943 + 16.854 = 73.7483$$

$$25.843 - 7.4 = 18.443$$

$$5,784 \div 1,000 = 5.784$$

$$0.89 + 15.2 - 7.853 = 8.237$$

$$19.72 \div 5.8 = 3.4$$

$$87.84 \times 100 = 8,784$$

Round the answer to the nearest tenth.

$$7.584 + 0.57 - 3.851 = 4.3$$

$$.89 \times 6 + 100.78 = 106.1$$

$$853.6 + .55 + 7.905 = 862.1$$

Exercise 44**Just by looking at the top row, identify the calculations that are wrong.**

$$6.34 \times 8.91 = 5.64894 \text{ wrong} \quad 25.09 \times 2.8 = 70.252 \quad 5.8 \times .45 = .261 \text{ wrong}$$

$$14\% \text{ of } 980 = 137.2 \quad 78 \text{ is } 20\% \text{ of what number? } 390 \quad 12 \text{ is } 75\% \text{ of what number? } 16$$

$$15 \text{ is what } \% \text{ of } 50? \ 30\% \quad 99\frac{1}{2}\% \text{ of } 6,000 = 5,970 \quad 30 \text{ is what } \% \text{ of } 20? \ 150\%$$

$$38\% \text{ of } \$785 = \$298.30 \quad 12\frac{1}{5}\% \text{ of } \$25,500 = \$3,111 \quad 1\frac{1}{4}\% \text{ of } 20,000 = 250$$

Exercise 45

Heather cared for the Turner triplets for $5\frac{1}{4}$ hours at the rate of \$4 per hour. How much did she earn? $\$21$

$$5\frac{1}{4} \times \$4 = \$21$$

Heather spent $\frac{2}{3}$ of the money that she earned caring for the triplets and then lost $\frac{3}{4}$ of the money that she had left. How much money does Heather still have? $\$1.75$

$$\frac{2}{3} \times \$21 = \$14 \quad \$7.00$$

$$\frac{3}{4} \times \$7 = \frac{21}{4} = \$5.25 \quad \frac{-5.25}{\$1.75}$$

The money that Heather has left is in nickels and dimes. She had 5 more nickels than dimes. How many of each coin does she have?

10 dimes and 15 nickels

Heather gave all the money that she had left to her Sunday school class.

What percent of the money that she earned did she give? Find the answer

to the nearest whole percent. 8% $\$1.75 \text{ is what } \% \text{ of } \21 $\frac{.083}{21} = 8\%$

$$x = \text{dimes (10)}$$

$$x + 5 = \text{nickels (15)}$$

$$.1x + .05(x + 5) = 1.75$$

$$.1x + .05x + .25 = 1.75$$

$$10x + 5x + 25 = 175$$

$$x = 10$$

Exercise 46

(To find interest, use the simple interest formula, $i = prt$. i = interest; p = principal; r = rate written as a decimal; t = time in years)

Find the simple interest.

$$p = \$925; r = 13\%; t = 1 \text{ yr. } \$120.25 \quad p = \$1,000; r = 12\frac{5}{8}\%; t = 9 \text{ mo. } \$94.69$$

$$p = \$3,200; r = 16\frac{1}{2}\%; t = 2 \text{ yr. } \$1,056 \quad p = \$16,000; r = 6\frac{3}{4}\%; t = 5 \text{ yr. } \$5,400$$

$$p = \$1,460; r = 11\%; t = 3 \text{ mo. } \$40.15 \quad p = \$500; r = 13\frac{1}{4}\%; t = 6 \text{ mo. } \$33.13$$

Exercise 47

(Since speed is the distance covered in a unit of time, it can be expressed by the ratio, speed = $\frac{\text{distance}}{\text{time}}$. The formula $s = \frac{d}{t}$ is often used to show the relationship.)

Find the speed.

$$152 \text{ mi. in } 4 \text{ hr. } 38 \text{ mph} \quad 860 \text{ mi. in } 2 \text{ hr. } 430 \text{ mph} \quad 1,764 \text{ mi. in } 36 \text{ hr. } 49 \text{ mph}$$

Find the distance.

$$45 \text{ mph for } 3 \text{ hr. } 135 \text{ mi.} \quad 630 \text{ mph for } 1\frac{1}{2} \text{ hr. } 945 \text{ mi.} \quad 54 \text{ mph for } 11 \text{ hr. } 594 \text{ mi.}$$

Find the time.

$$560 \text{ mph for } 4,760 \text{ mi. } 8\frac{1}{2} \text{ hr.} \quad 54 \text{ mph for } 27 \text{ mi. } \frac{1}{2} \text{ hr.} \quad 437 \text{ mph for } 1,748 \text{ mi. } 4 \text{ hr.}$$

Exercise 48

(Remember, whatever is done to one side of the equation must be done to the other side.)

Solve for x .

$$x + 5 = \frac{20}{2} \quad 5$$

$$x - 3 = 12 \quad 15$$

$$3x = 9 \quad 3$$

$$x + 6 = 20 + 5 \quad 19$$

$$\frac{1}{2}x = 3 \quad 6$$

$$5x = 25 - 10 \quad 3$$

$$6x + 2\frac{1}{2} = 14\frac{1}{2} \quad 2$$

$$\frac{x}{6} = 18 \quad 108$$

$$\frac{2}{3}x = 12 - 4 \quad 12$$

Exercise 49

Solve for x .

$$6x - 3x = 12 \quad 4$$

$$2.5x + 1.0x = 7 \quad 2$$

$$3x - 2x + 4 = \frac{15}{3} \quad 1$$

$$3x - 5 = x + 3 \quad 4$$

$$5x = 4 + x \quad 1$$

$$4x + 7 = 2x + 17 \quad 5$$

$$\frac{1}{2}x + \frac{1}{5}x = 14 \quad 20$$

$$\frac{2}{3}x = \frac{1}{2} \quad \frac{3}{4}$$

$$.5x = 10 \quad 20$$

Exercise 50

In 1990, the population of a city was 500,000. From 1991 to 1992, the population increased 5% both years. From 1993 to 1996, the population decreased 20% each year. What was the population at the end of 1996?

$$\begin{array}{r} 500,000 \quad 525,000 \quad 551,250 \\ \times .05 \quad \times .05 \quad \times .8 \\ \hline 25,000.00 \quad 26,250.00 \quad 441,000.0 \\ \hline 441,000 \quad 352,800 \quad 282,240 \\ \times .8 \quad \times .8 \quad \times .8 \\ \hline 352,800.0 \quad 282,240.0 \quad 225,792.0 \end{array}$$

In 1990, 225,000 of the population was under the age of 18. What percent of the population was under 18? 45% $\frac{225,000}{500,000} = \frac{45}{100} = 45\%$

Sixty percent of the 225,000 attended a public education program. An average of \$8,800 was spent per child on education. How much was spent on education in that city? Round the answer to the nearest hundred million. $1,200,000,000$

$$\begin{array}{r} 225,000 \quad 135,000 \\ \times .6 \quad \times 8,800 \\ \hline 135,000.0 \quad 10800000 \\ \hline 1,188,000,000 = \\ 1,200,000,000 \end{array}$$

Exercise 51

(The absolute value of a number is the distance that number is from the reference point. Distance cannot be negative. For instance, both -4 and $+4$ are 4 units away from 0 on the number line. Therefore, $|-4|$ and $|+4|$ are 4. Parallel bars around a signed number indicate absolute value.)

Give the absolute value.

$$|-16| \quad 16 \quad | +9 | \quad 9 \quad | 19 | \quad 19 \quad | -23 | \quad 23 \quad | +5 | \quad 5 \quad | -100 | \quad 100$$

$$15\text{-yard loss in football} \quad 15 \quad 1,200 \text{ feet above sea level} \quad 1,200 \quad 12^\circ\text{F. below zero} \quad 12$$

$$\text{gross profit of } \$25 \quad 25 \quad \$100 \text{ withdrawn from bank} \quad 100 \quad \text{loss of } \$12 \quad 12$$

Exercise 52

(When comparing signed numbers, picture a number line. The number to the right on the number line is greater than the number to the left.)

Write $>$ (greater than) or $<$ (less than).

$$-8 < -6$$

$$72 > -89$$

$$14 < 17$$

$$0 > -3$$

$$-15 > -21$$

$$-12 < 10$$

$$|-6| < |-7|$$

$$|15| < |-20|$$

$$|-9| > |+6|$$

Solve for x .

$$2x - 6 = 18 \quad 12$$

$$.4x = 2.4 \quad 6$$

$$\frac{2x}{3} = 4 \quad 6$$

$$3x + 9 = 2x + 24 \quad 15$$

$$5x + 4 = 24 \quad 4$$

$$3(x + 7) = 51 \quad 10$$

Exercise 53

(When addends have the same sign, add and keep the sign. When addends have opposite signs, subtract and keep the sign of the addend with the greater absolute value.)

$$(+9) + (+7) = 16$$

$$(-6) + (-8) = -14$$

$$(-23) + (+18) = -5$$

$$(-5) + (-12) = -17$$

$$(+7) + (-8) = -1$$

$$(-12) + (+6) = -6$$

(In algebra, subtraction is adding the inverse. That means, change the sign of the subtrahend and follow the rules for addition.)

$$(18) - (+18) = 0$$

$$(25) - (+6) = 19$$

$$(-52) - (-14) = -38$$

$$(23) - (-8) = 31$$

$$(-12) - (+5) = -17$$

$$(15) - (10) = 5$$

$$(+16) + (-8) + (-7) + (+12) + (-17) = -4$$

$$(-5) - (-3) + (-8) - (-6) + (-5) = -9$$

Exercise 54

(When factors have the same sign, the product is positive. When the signs are opposite, the product is negative. Zero is neither negative nor positive.)

$$(-6) \times (-4) = 24$$

$$(-8) \times (3) = -24$$

$$(6) \times (12) = 72$$

$$(-11) \times (4) = -44$$

$$(-3)(0)(+4)(-8)(-5) = 0$$

$$(-6)(+5)(+4)(-3)(-2)(+1) = -720$$

(When the dividend and divisor have the same sign, the quotient is positive. When the signs are opposite, the quotient is negative.)

$$\frac{28}{4} = 7 \quad \frac{-18}{6} = -3 \quad \frac{25}{-5} = -5 \quad \frac{-42}{-7} = 6 \quad \frac{56}{8} = 7 \quad \frac{-48}{6} = -8$$

$$\frac{-72}{-9} = 8 \quad \frac{14}{-2} = -7 \quad \frac{-54}{6} = -9 \quad \frac{-35}{-7} = 5 \quad \frac{36}{3} = 12 \quad \frac{-48}{-12} = 4$$

Exercise 55

(Use a letter to **represent** the unknown number. If more than one number is to be found, use a letter to represent one of the numbers and represent all other numbers in terms of that letter. **Form** an equation from the information given in the problem using the letter or letters that represent the unknown numbers. **Solve** the equation.)

Four times a certain number is 92. What is the number?

$$4x = 92; x = 23$$

$$4x = 92$$

$$\frac{4x}{4} = \frac{92}{4}$$

$$x = 23$$

$$7x = 266$$

$$\frac{7x}{7} = \frac{266}{7}$$

$$x = 38$$

Seven times a certain number is 266. What is the number?

$$7x = 266; x = 38$$

The sum of a certain number and 15 is 41. What is the number?

$$x + 15 = 41; x = 26$$

$$x + 15 = 41$$

$$x + 15 - 15 = 41 - 15$$

$$x = 26$$

$$x + 2x = 24$$

$$3x = 24$$

$$\frac{3x}{3} = \frac{24}{3}$$

$$x = 8$$

$$2x = 16$$

Separate the number 24 into two parts so that one number is twice the other number.

$$x + 2x = 24; x = 8; 2x = 16$$

If 5 times a number is decreased by 12, the result is 108. What is the number?

$$5x - 12 = 108; x = 24$$

$$5x - 12 = 108 + 12$$

$$5x - 12 + 12 = 108 + 12$$

$$5x = 120$$

$$\frac{5x}{5} = \frac{120}{5}$$

$$x = 24$$

$$3x - 3 = 45$$

$$3x - 3 + 3 = 45 + 3$$

$$3x = 48$$

$$\frac{3x}{3} = \frac{48}{3}$$

$$x = 16$$

Three less than three times a number is 45. What is the number?

$$3x - 3 = 45; x = 16$$

Lynn is 4 years younger than her sister Tobbe. If the sum of their ages is 18, how old are Lynn and Tobbe?

$$x + x - 4 = 18; x = 11; x - 4 = 7$$

$$x + x - 4 = 18$$

$$2x - 4 + 4 = 18 + 4$$

$$2x = 22$$

$$\frac{2x}{2} = \frac{22}{2}$$

$$x = 11 \quad x - 4 = 7$$

Exercise 56

(In a proportion, the product of the means should equal the product of the extremes.)

Solve for x .

$$\frac{3}{8} = \frac{12}{x} \quad 32$$

$$\frac{4}{6} = \frac{x}{12} \quad 8$$

$$\frac{5}{11} = \frac{9}{x} \quad 19.8$$

$$\frac{7}{8} = \frac{x}{16} \quad 14$$

$$\frac{x}{5} = \frac{10}{12} \quad 4.1\bar{6}$$

$$\frac{4}{9} = \frac{7}{x} \quad 15.75$$

$$\frac{2}{7} = \frac{x}{21} \quad 6$$

$$\frac{3}{5} = \frac{9}{x} \quad 15$$

Exercise 57

(When evaluating algebraic expressions, remember to use the correct order of operations after proper substitutions have been made.)

Simplify if $x = 5$ and $y = 4$.

$$x + y = 9$$

$$xy = 20$$

$$5xy = 100$$

$$2x + 3y - xy = 2$$

Simplify if $a = -2$, $b = 3$, and $x = 4$.

$$abx = -24$$

$$3ab = -18$$

$$3a + 2b - 4x = -16$$

$$x + 7ab = -38$$

Exercise 58**Solve for x.**

$x + 3 = 19 \quad 16$

$2x + 4 = 16 \quad 6$

$5x - 6 = 3x + 4 \quad 5$

$\frac{x}{2} - 6 = 4 \quad 20$

$.3x = 2.7 \quad 9$

$\frac{1}{3}x = 5 \quad 15$

$2x = 18 \quad 9$

$7x - 9 = 5x + 3 \quad 6$

Simplify.

$(9) + (-12) = -3$

$(-5)(-4) = 20$

$-\frac{12}{6} = -2$

$(-6) - (-7) = 1$

Exercise 59 (quiz—6 each)**Simplify.**

$(-8) - (-6) = -2$

$(-12)(-3) = 36$

$-\frac{10}{-5} = 2$

$(-13) + (+7) = -6$

$\frac{24}{-8} = -3$

$(-6)(-5)(2) = 60$

$(11) - (-8) = 19$

$(-5) + (-6) + (-7) - (-5) = -13$

$(-5)(0)(6) = 0$

$-\frac{16}{4} = -4$

$(-12) + (-4) = -16$

$(9) - (-8) = 17$

Solve for x.

$x - 5 = 4 \quad 9$

$\frac{2}{3}x = 4 \quad 6$

$9x - 9 = 7x + 3 \quad 6$

$\frac{x}{5} + 1 = 3 \quad 10$

Exercise 60**Write a proportion and solve.**

If 4 pounds of meat serves 10 people, how many pounds are needed to serve 17 people? $\frac{4}{10} = \frac{x}{17}; x = 6.8 \text{ lb.}$

Mr. Rhodes traveled 623 miles in 7 hours. At the same rate, how many miles will he travel in 9 hours? $\frac{623}{7} = \frac{x}{9}; x = 801 \text{ mi.}$

On a scale drawing, $\frac{1}{4}$ inch equals 1 foot. If the length of a room on a scale drawing is $5\frac{1}{4}$ inches, how long is the room? $\frac{\frac{1}{4}}{1} = \frac{5\frac{1}{4}}{x}; x = 21 \text{ ft.}$

If 7 pencils cost \$.84, find the cost of 10 pencils.

$\frac{7}{.84} = \frac{10}{x}; x = \1.20

$\frac{7}{.84} = \frac{10}{x}$

$7x = 8.4$

$\frac{7x}{7} = \frac{8.4}{7}$

$x = \$1.20$

$\frac{4}{10} = \frac{x}{17}$

$10x = 68$

$\frac{10x}{10} = \frac{68}{10}$

$x = 6.8 \text{ lb.}$

$\frac{623}{7} = \frac{x}{9}$

$7x = 5,607$

$\frac{7x}{7} = \frac{5,607}{7}$

$x = 801 \text{ mi.}$

$\frac{\frac{1}{4}}{1} = \frac{5\frac{1}{4}}{x}$

$\frac{1}{4}x = 5\frac{1}{4}$

$\cancel{4} \cdot \frac{1}{\cancel{4}}x = \frac{21}{\cancel{4}} \cdot \cancel{4}$

$x = 21 \text{ ft.}$

Exercise 61

(An exponent is a figure, usually a number, written a little to the right and above a number or letter (called the base) and indicates the number of times the base is to be used as a factor.)

Simplify if $a = 2$, $b = 3$, and $x = 4$.

$$x^2 - ab = 10 \quad b^4 + x = 85 \quad a^3 b^2 x = 288 \quad 2a^2 x = 32$$

$$x + a^2 b = 16 \quad 3a + b^2 - 2x = 7 \quad 2a^2 + 3(b + x^2) = 65 \quad 4(x^2 - a^2) = 48$$

Exercise 62

(To write a negative power as a positive power, write it as a reciprocal. 10^{-2} can be written as $\frac{1}{10^2}$.)

Write as a positive power.

$$5^{-2} \frac{1}{5^2} \quad x^{-2} \frac{1}{x^2} \quad b^{-3} \frac{1}{b^3} \quad y^{-5} \frac{1}{y^5}$$

$$\frac{1}{8^{-2}} 8^2 \quad \frac{1}{a^{-3}} a^3 \quad \frac{1}{10^{-5}} 10^5 \quad \frac{1}{x^{-2}} x^2$$

Evaluate each.

$$5^{-2} = \frac{1}{25} \quad 10^{-2} = \frac{1}{100} \quad 8^{-3} = \frac{1}{512} \quad 2^{-5} = \frac{1}{32}$$

Exercise 63

(Every number is the product of equal factors, known as the root of the original number. A perfect square root is a number whose square root is a whole number.)

Write the perfect square.

$$\sqrt{16} \ 4 \quad \sqrt{64} \ 8 \quad \sqrt{144} \ 12 \quad \sqrt{9} \ 3 \quad \sqrt{4} \ 2 \quad \sqrt{25} \ 5$$

$$\sqrt{121} \ 11 \quad \sqrt{81} \ 9 \quad \sqrt{1} \ 1 \quad \sqrt{100} \ 10 \quad \sqrt{49} \ 7 \quad \sqrt{169} \ 13$$

Evaluate if $a = \sqrt{4}$, $b = \sqrt{25}$, and $x = \sqrt{9}$.

$$abx = 30 \quad 3ab = 30 \quad 3a + 2b - 4x = 4 \quad x + 7ab = 73$$

Exercise 64

Extract the square root.

$$\sqrt{2,809} \ 53 \quad \sqrt{400} \ 20 \quad \sqrt{625} \ 25 \quad \sqrt{169} \ 13 \quad \sqrt{196} \ 14$$

$$\sqrt{1,764} \ 42 \quad \sqrt{5,041} \ 71 \quad \sqrt{961} \ 31 \quad \sqrt{4,356} \ 66 \quad \sqrt{8,100} \ 90$$

Exercise 65

What percent of the first 15 whole numbers have exactly 4 distinct whole number divisors? (1, 2, 3, and 6 are the four distinct divisors of 6.) $6 - 1, 2, 3, 6$ $\frac{5}{15} = 33\frac{1}{3}\%$
 $8 - 1, 2, 4, 8$
 $10 - 1, 2, 5, 10$
 $14 - 1, 2, 7, 14$
 $15 - 1, 3, 5, 15$
 $33\frac{1}{3}\%$
 What percent of the first 10 whole numbers are prime? (Remember, a prime number has only 1 and itself as factors.) 2, 3, 5, 7 $\frac{4}{10} = 40\%$
 40%
 What percent of the first 10 whole numbers are perfect squares? 1, 4, 9 $\frac{3}{10} = 30\%$
 30%

Exercise 66

(The mean of a group of statistics is the average and is found in the same way as an arithmetic average.)

Find each mean.

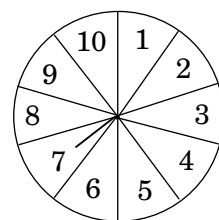
56; 59; 51; 63; 68; 57; 52 58 146; 153; 117; 148 141 200; 141; 257; 199 199.25
 912; 738; 420 690 15; 9; 7; 6; 8; 11; 4; 9; 6; 7 8.2 19; 27; 34; 18; 23 24.2

Exercise 67

(Mathematical probability is a number expressed as a ratio that shows how likely it is that something will occur. Use this formula: Probability = $\frac{\text{number of favorable outcomes}}{\text{total number of possible outcomes}}$.)

Answer the questions about a spinner with the numbers 1–10 on its face.

What is the probability that the pointer will stop on 7? $\frac{1}{10}$
 What is the probability that the pointer will stop on 3 or 9? $\frac{1}{5}$
 What is the probability that the pointer will stop on a perfect square? $\frac{3}{10}$
 What is the probability that the pointer will stop on an even number? $\frac{1}{2}$
 What is the probability that the pointer will stop on a prime number? $\frac{2}{5}$

**Exercise 68**

Write a proportion and find each answer. Use this format for the proportion: $\frac{\text{percentage}}{\%} = \frac{\text{base}}{100\%}$.

14% of 980 $\frac{x}{14} = \frac{980}{100}$ 12 is 75% of what number? $\frac{12}{75} = \frac{x}{100}$ 150 is 120% of what number? $\frac{150}{120} = \frac{x}{100}$
 $x = 137.2$ $x = 16$ $x = 125$
 $3\frac{1}{2}\%$ of 50 $\frac{x}{3.5} = \frac{50}{100}$ 15 is what % of 50? $\frac{15}{x} = \frac{50}{100}$ 28 is what % of 140? $\frac{28}{x} = \frac{140}{100}$
 $x = 1.75$ $x = 30\%$ $x = 20\%$
 150% of 80 $\frac{x}{150} = \frac{80}{100}$ 30 is what % of 20? $\frac{30}{x} = \frac{20}{100}$ 78 is 20% of what number? $\frac{78}{20} = \frac{x}{100}$
 $x = 120$ $x = 150\%$ $x = 390$

Exercise 69 (quiz—8 each)

$$7\frac{5}{9} + 6\frac{2}{3} = 14\frac{2}{9} \quad 10\frac{1}{2} - 3\frac{3}{4} = 6\frac{3}{4} \quad 2\frac{2}{3} \times \frac{9}{10} = 2\frac{2}{5} \quad \frac{5}{6} \div \frac{5}{9} = 1\frac{1}{2}$$

$$1\frac{1}{2} + 1\frac{1}{2} + 1\frac{1}{2} = 4\frac{1}{2} \quad 1\frac{1}{2} - 1\frac{1}{2} - 1\frac{1}{2} = -1\frac{1}{2} \quad 1\frac{1}{2} \times 1\frac{1}{2} = 2\frac{1}{4} \quad 1\frac{1}{2} \div 1\frac{1}{2} = 1$$

$$\frac{1}{2}\% \text{ of } 1,000 = 5 \quad 1\frac{1}{4}\% \text{ of } 1,000 = 12.5 \quad \frac{3}{5}\% \text{ of } 1,000 = 6 \quad 6\frac{3}{4}\% \text{ of } 1,000 = 67.5$$

Exercise 70

What is the probability that two numbers chosen at random from this group (1, 2, 3, 4) has a product greater than 6? $\frac{1}{3}$

$$\begin{array}{l} 1 \times 2 \quad 2 \times 3 \quad (3 \times 4) \\ 1 \times 3 \quad (2 \times 4) \\ 1 \times 4 \end{array}$$

What is the probability that two numbers chosen at random from this group (1, 2, 3, 4, 5) has a product greater than 12? $\frac{1}{5}$

$$\begin{array}{l} \frac{2}{6} = \frac{1}{3} \\ 1 \times 2 \quad 2 \times 3 \quad (3 \times 4) \quad (4 \times 5) \\ 1 \times 3 \quad 2 \times 4 \quad (3 \times 5) \end{array}$$

If 21 students write their names on pieces of paper and put them in a hat, what is the probability that the first student who draws will draw his own name? $\frac{1}{21}$

$$\begin{array}{l} 1 \times 4 \quad 2 \times 5 \\ 1 \times 5 \quad \frac{2}{10} = \frac{1}{5} \end{array}$$

Suppose a monkey types at a typewriter with only 26 capital letters on the keyboard and types one letter. What is the probability that the monkey will type the letter *M*? $\frac{1}{26}$

Exercise 71

Solve for *x*. Give only positive values.

$$2x - 4 = 3x - 5 \quad 1 \quad \frac{3}{4}x + \frac{1}{8}x = 7 \quad 8 \quad .2x + .15x = 2.1 \quad 6 \quad \frac{2}{3}x + 1 = \frac{5}{6}x - 3 \quad 24$$

$$x^2 = 16 \quad 4 \quad x^2 = 81 \quad 9 \quad \frac{1}{x^2} = 16 \quad \frac{1}{4} \quad \frac{1}{x^2} = 81 \quad \frac{1}{9}$$

Exercise 72

$$5.78 + 9.9 - 0.785 = 14.895 \quad 12.21 - 4.893 + 7.9 = 15.217 \quad 45.894 + 0.93 + 7.8328 = 54.6568$$

$$8.9463 \times .8 = 7.15704 \quad .09685 \times 3,000 = 290.55 \quad 69.896 \times .001 = .069896$$

$$2.8 \div .05 = 56 \quad 45.63 \div 16.9 = 2.7 \quad .0774 \div .0006 = 129$$

Estimate the answers by rounding the terms to the nearest whole numbers.

$$20.3 \times 9.6 \div 1.01 = 200 \quad 0.899 \times 7.5120 = 8 \quad 8.12 \times 9.83 \div 19.715 = 4$$

Exercise 73

Find the simple interest.

$$p = \$15,000; r = 9\%; t = 7 \text{ yr. } \$9,450 \quad p = \$875; r = 10\frac{1}{2}\%; t = 2 \text{ mo. } \$15.31$$

$$p = \$4,500; r = 8\frac{1}{2}\%; t = 2 \text{ yr. } \$765 \quad p = \$55,000; r = 7\frac{3}{4}\%; t = 15 \text{ yr. } \$63,937.50$$

$$p = \$500; r = 18\%; t = 3 \text{ mo. } \$22.50 \quad p = \$1,250; r = 6\frac{1}{4}\%; t = 6 \text{ mo. } \$39.06$$

Exercise 74

(To write a number using scientific notation, write the number as a decimal between 1 and 10. Then multiply or divide by the correct power of ten. If you multiply, the exponent is positive. If you divide, the exponent is negative.)

Write using scientific notation.

$$5,800,000 \quad 5.8 \times 10^6 \quad 869,000,000 \quad 8.69 \times 10^8 \quad .0000567 \quad 5.67 \times 10^{-5} \quad 7,300 \quad 7.3 \times 10^3$$

$$.0473 \quad 4.73 \times 10^{-2} \quad 5,890,000 \quad 5.89 \times 10^6 \quad 768,000 \quad 7.68 \times 10^5 \quad .000574 \quad 5.74 \times 10^{-4}$$

$$32,000 \quad 3.2 \times 10^4 \quad .00007 \quad 7.0 \times 10^{-5} \quad 576.4 \quad 5.764 \times 10^2 \quad .0013 \quad 1.3 \times 10^{-3}$$

Exercise 75

The sum of two consecutive numbers is 27. What are the two numbers? $x + x + 1 = 27$; $x = 13$; $x + 1 = 14$

$$x + x + 1 = 27$$

$$2x + 1 - 1 = 27 - 1$$

$$2x = 26$$

$$\frac{2x}{2} = \frac{26}{2}$$

$$x = 13$$

$$x + 1 = 14$$

The sum of five consecutive numbers is -5 . What is the largest of the numbers? $x + x + 1 + x + 2 + x + 3 + x + 4 = -5$; $x + 4 = 1$

$$x + x + 1 + x + 2 + x + 3 + x + 4 = -5$$

$$5x + 10 = -5$$

$$5x + 10 - 10 = -5 - 10$$

$$5x = -15$$

$$\frac{5x}{5} = \frac{-15}{5}$$

$$x = -3$$

$$x + 1 = -2$$

$$x + 2 = -1$$

$$x + 3 = 0$$

$$x + 4 = 1$$

$$2x + 2x + 2 + 2x + 4 = 48$$

$$6x + 6 = 48$$

$$6x + 6 - 6 = 48 - 6$$

$$6x = 42$$

$$\frac{6x}{6} = \frac{42}{6}$$

$$x = 7$$

$$2x = 14$$

The sum of 3 consecutive even numbers is 48. What is the smallest number? $2x + 2x + 2 + 2x + 4 = 48$; $2x = 14$

When the smaller of two consecutive numbers is added to the numerator and the larger is added to the denominator in the fraction $\frac{2}{3}$, the result is $\frac{3}{4}$. Find the numbers.

$$\frac{2+x}{3+x+1} = \frac{3}{4}; x = 4; x + 1 = 5$$

$$\frac{2+x}{3+x+1} = \frac{3}{4}$$

$$\frac{2+x}{4+x} = \frac{3}{4}$$

$$4x + 8 = 3x + 12$$

$$4x - 3x + 8 - 8 = 3x - 3x + 12 - 8$$

$$x = 4$$

$$x + 1 = 5$$

Exercise 76

Write the prime factors.

$$144 \quad 2 \times 2 \times 2 \times 2 \times 3 \times 3 \quad 57 \quad 3 \times 19 \quad 108 \quad 2 \times 2 \times 3 \times 3 \times 3 \quad 64 \quad 2 \times 2 \times 2 \times 2 \times 2 \times 2$$

Write the greatest common factor (gcf) for each set of numbers.

$$36; 24; 48 \quad 12 \quad 15; 12; 75 \quad 3 \quad 30; 20; 50 \quad 10 \quad 18; 72; 36 \quad 18$$

Reduce to lowest terms.

$$\frac{12}{18} \frac{2}{3} \quad \frac{36}{40} \frac{9}{10} \quad \frac{24}{144} \frac{1}{6} \quad \frac{90}{115} \frac{18}{23} \quad \frac{10}{55} \frac{2}{11} \quad \frac{42}{56} \frac{3}{4} \quad \frac{81}{108} \frac{3}{4} \quad \frac{15}{45} \frac{1}{3}$$

Exercise 77

Order the fractions from least to greatest.

$$\frac{5}{8}; \frac{5}{9}; \frac{7}{8}; \frac{7}{9} \quad \frac{5}{9}; \frac{5}{8}; \frac{7}{9}; \frac{7}{8} \quad \frac{3}{4}; \frac{7}{8}; \frac{2}{3}; \frac{5}{6} \quad \frac{2}{3}; \frac{3}{4}; \frac{5}{6}; \frac{7}{8} \quad \frac{1}{13}; \frac{1}{5}; \frac{1}{10}; \frac{1}{8} \quad \frac{1}{13}; \frac{1}{10}; \frac{1}{8}; \frac{1}{5} \quad \frac{11}{15}; \frac{4}{15}; \frac{7}{15}; \frac{1}{15} \quad \frac{1}{15}; \frac{4}{15}; \frac{7}{15}; \frac{11}{15}$$

$$\frac{1}{8}; \frac{1}{6}; \frac{1}{3}; \frac{1}{5} \quad \frac{1}{8}; \frac{1}{6}; \frac{1}{5}; \frac{1}{3} \quad \frac{2}{3}; \frac{2}{11}; \frac{2}{9}; \frac{2}{7} \quad \frac{2}{11}; \frac{2}{9}; \frac{2}{7}; \frac{2}{3} \quad \frac{5}{8}; \frac{2}{3}; \frac{3}{4}; \frac{5}{6} \quad \frac{5}{8}; \frac{2}{3}; \frac{3}{4}; \frac{5}{6} \quad \frac{7}{25}; \frac{13}{50}; \frac{17}{100}; \frac{1}{10} \quad \frac{1}{10}; \frac{17}{100}; \frac{13}{50}; \frac{7}{25}$$

Exercise 78

(In order of operations, powers and radicals are simplified before multiplication and division are done in the order they appear.)

Simplify.

$$6 + 3^2 \times 6 - 40 = 20$$

$$3.14(5)^2 = 78.5$$

$$\frac{1}{3}(3.14)(5)^2(15) = 392.5$$

$$4^2 + 3^2 - 2^2 = 21$$

$$4^2 \times 3^2 \div 2^2 = 36$$

$$5(\sqrt{9} + \sqrt{25} - \sqrt{100}) = -10$$

Write using scientific notation.

$$786,000 \quad 7.86 \times 10^5$$

$$.000043 \quad 4.3 \times 10^{-5}$$

$$18,890,000 \quad 1.889 \times 10^7$$

$$.0000058 \quad 5.8 \times 10^{-6}$$

Exercise 79 (quiz—7 each)

Simplify.

$$3 + 8 \div 4 = 5$$

$$6^2 - 4 \times 2 = 28$$

$$\frac{9}{3} + 8(4 \div 2) = 19$$

$$(5 - 4)(6 + 2) = 8$$

$$9 \div 3 + 2 = 5$$

$$\frac{9 + 3 \times 2}{3} = 5$$

Write using scientific notation.

$$8,400 \quad 8.4 \times 10^3$$

$$.034 \quad 3.4 \times 10^{-2}$$

$$.00028 \quad 2.8 \times 10^{-4}$$

$$125,000 \quad 1.25 \times 10^5$$

Write the prime factors.

$$12 \quad 2 \times 2 \times 3$$

$$25 \quad 5 \times 5$$

$$16 \quad 2 \times 2 \times 2 \times 2$$

$$20 \quad 2 \times 2 \times 5$$

Exercise 80

Find the 2-digit repetend (the digits that repeat indefinitely in a repeating decimal) for $\frac{7}{11} \dots 63 \dots$ $\frac{.63 \dots}{11 \overline{)7.0000}}$

Find the 6-digit repetend for $\frac{5}{13} \dots 384615 \dots$ $\frac{.384615 \dots}{13 \overline{)5.000000}}$

Find the 16-digit repetend for $\frac{3}{17} \dots 1764705882352941 \dots$ $\frac{.1764705882352941 \dots}{17 \overline{)3.0000000000000000}}$

Exercise 81

Evaluate if $m = -3$, $n = 2$, $x = 0$, and $y = -1$.

$$m^2 - my = 6$$

$$4n^3 = 32$$

$$3(m - n) = -15$$

$$\frac{mn}{ny} = 3$$

$$2mn^2 + 4x = -24$$

$$5m - n^2y = -11$$

$$m^2n^2xy^2 = 0$$

$$16xy + 2mn = -12$$

Exercise 82

Find each mean.

$-5; 6; -4; -7; 8; -6; 0; 8$ $|-3|; |-8|; |-9|; |4|$ $\sqrt{16}; \sqrt{81}; \sqrt{36}; \sqrt{25}$
 $234; 896; 473; 684; 678; 335$ 5% of 80; 10% of 80; 15% of 80; 30% of 80

Find the probability concerning a spinner with the numbers 1–25. Express each answer as a percent.

What is the probability that the pointer will stop on a perfect square? 20%

What is the probability that the pointer will stop on a prime number? 36%

What is the probability that the pointer will stop on a number greater than the mean of 12; 16; 20; 22; and 15? 32%

What is the probability that the pointer will stop on a negative number? 0%

Exercise 83

Find the travel time. Use hours and minutes for the first three problems. Use years, days, hours, and minutes for the last problem.

Derek left his house at 6:40 A.M. and arrived at school at 7:55 A.M. 1 hr. 15 min.

The plane took off at 10:45 A.M. and landed at 1:15 P.M. 2 hr. 30 min.

The boat left harbor at 3:00 P.M. on Monday and returned on Thursday at 1:30 A.M. 58 hr. 30 min.

The spacecraft left on June 3, 1994, at 8:00 A.M. and returned on August 28, 1997, at 4:14 P.M. 3 yr. 86 da. 8 hr. 14 min.

Exercise 84

(Perimeter is the distance around a polygon and is found by adding the lengths of the sides. The formula for the perimeter of a square is $P = 4s$. The formula for a rectangle is $P = 2l + 2w$.)

Find the perimeter.

Rectangle	Square	Square
$l = 19$ ft.	$s = 9$ in. 36 in.	$s = 4.3$ ft. 17.2 ft.
$w = 7$ ft. 52 ft.		

Rectangle	Rectangle	Square
$l = 11$ in.	$l = 5$ ft.	$s = 2\frac{2}{3}$ in. $10\frac{2}{3}$ in.
$w = 9\frac{1}{2}$ in. 41 in.	$w = 15$ in. 150 in. or $12\frac{1}{2}$ ft.	

Exercise 85

How many integers (counting numbers, inverses of counting numbers, and 0) satisfy $1 < |x - \frac{2}{3}| < 3$? (Remember, parallel bars around a quantity mean absolute value.) 4

$$\begin{array}{cccc} x = -2 & x = -1 & x = 2 & x = 3 \\ 1 < |-2 - \frac{2}{3}| < 3 & 1 < |-1 - \frac{2}{3}| < 3 & 1 < |2 - \frac{2}{3}| < 3 & 1 < |3 - \frac{2}{3}| < 3 \\ 1 < 2\frac{2}{3} < 3 & 1 < 1\frac{2}{3} < 3 & 1 < 1\frac{1}{3} < 3 & 1 < 2\frac{1}{3} < 3 \end{array}$$

How many integers satisfy $5 \leq x + 3 \leq 10$? (\leq means less than or equal to.) 6

$$\begin{array}{cccccc} x = 2 & x = 3 & x = 4 & x = 5 & x = 6 & x = 7 \\ 5 \leq 2 + 3 \leq 10 & 5 \leq 3 + 3 \leq 10 & 5 \leq 4 + 3 \leq 10 & 5 \leq 5 + 3 \leq 10 & 5 \leq 6 + 3 \leq 10 & 5 \leq 7 + 3 \leq 10 \\ 5 \leq 5 \leq 10 & 5 \leq 6 \leq 10 & 5 \leq 7 \leq 10 & 5 \leq 8 \leq 10 & 5 \leq 9 \leq 10 & 5 \leq 10 \leq 10 \end{array}$$

How many integers satisfy $2 \leq |x + 1| \leq 5$? 8

$$\begin{array}{cccccc} x = -6 & x = -5 & x = -4 & x = -3 & & \\ 2 \leq |-6 + 1| \leq 5 & 2 \leq |-5 + 1| \leq 5 & 2 \leq |-4 + 1| \leq 5 & 2 \leq |-3 + 1| \leq 5 & & \\ x = 1 & x = 2 & x = 3 & x = 4 & & \\ 2 \leq |1 + 1| \leq 5 & 2 \leq |2 + 1| \leq 5 & 2 \leq |3 + 1| \leq 5 & 2 \leq |4 + 1| \leq 5 & & \\ 2 \leq 2 \leq 5 & 2 \leq 3 \leq 5 & 2 \leq 4 \leq 5 & 2 \leq 5 \leq 5 & & \end{array}$$

Exercise 86

(Area is the measure of the surface of a simple closed shape. The formula for the area of a square is $A = s^2$. The formula for a rectangle is $A = lw$. The formula for a triangle is $A = \frac{1}{2}bh$.)

Find the area.

Rectangle

$$l = 7 \text{ ft.}$$

$$w = 6 \text{ ft. } 42 \text{ sq. ft.}$$

Square

$$s = 11 \text{ in. } 121 \text{ sq. in.}$$

Triangle

$$b = 4.3 \text{ ft.}$$

$$h = 5 \text{ ft. } 10.75 \text{ sq. ft.}$$

Rectangle

$$l = 9\frac{3}{4} \text{ in.}$$

$$w = 4\frac{4}{5} \text{ in. } 46\frac{4}{5} \text{ sq. in.}$$

or 46.8 sq. in.

Triangle

$$b = 5\frac{1}{3} \text{ ft.}$$

$$h = 24 \text{ in. } 5\frac{1}{3} \text{ sq. ft.}$$

or 768 sq. in.

Square

$$s = 5.5 \text{ in. } 30.25 \text{ sq. in.}$$

Exercise 87 (quiz—8 each)

Find the perimeter.

Rectangle

$$l = 3 \text{ ft.}$$

$$w = 2 \text{ ft. } 10 \text{ ft.}$$

Square

$$s = 4 \text{ in. } 16 \text{ in.}$$

Rectangle

$$l = 12 \text{ ft.}$$

$$w = 5 \text{ ft. } 34 \text{ ft.}$$

Find the area.

Rectangle

$$l = 10 \text{ yd.}$$

$$w = 8 \text{ yd. } 80 \text{ sq. yd.}$$

Triangle

$$h = 9 \text{ ft.}$$

$$b = 4 \text{ ft. } 18 \text{ sq. ft.}$$

Square

$$s = 4 \text{ in. } 16 \text{ sq. in.}$$

Write the square root.

$$\sqrt{49} \ 7$$

$$\sqrt{81} \ 9$$

$$\sqrt{169} \ 13$$

$$\sqrt{100} \ 10$$

$$\sqrt{121} \ 11$$

$$\sqrt{25} \ 5$$

Exercise 88

(Circumference is the distance around a circle. The formulas are $C = \pi d$ and $C = 2\pi r$.) (2 radii $[r]$ are equal to 1 diameter $[d]$.)

Find the circumference. If necessary, round off to the nearest hundredth.

$d = 4$ ft. *12.56 ft.* $r = 6.5$ m *40.82 m* $r = 17$ ft. *106.76 ft.* $d = 6$ in. *18.84 in.*
 $r = 2\frac{1}{2}$ yd. *15.7 yd.* $d = 12.9$ cm *40.51 cm* $d = 3.5$ km *10.99 km* $r = 7$ ft. *43.96 ft.*

Exercise 89

(The formula for the area of a circle is $A = \pi r^2$. Remember, 1 diameter equals 2 radii.)

Find the area. If necessary, round off to the nearest hundredth.

$d = 4$ ft. *12.56 sq. ft.* $r = 6.5$ m *132.67 m²* $r = 17$ ft. *907.46 sq. ft.* $d = 6$ in. *28.26 sq. in.*
 $r = 2\frac{1}{2}$ yd. *19.63 sq. yd.* $d = 12.9$ cm *130.63 cm²* $d = 3.5$ km *9.62 km²* $r = 7$ ft. *153.86 sq. ft.*

Exercise 90

What is the area of a rectangle that has a length of 3.134×10^3 ft. and a width of 2.568×10^3 ft.? Write your answer using scientific notation and with 2 significant figures. (Decimal part of scientific notation must be rounded to tenths to have 2 significant figures [sig figs].)

8.0×10^6 sq. ft.

$$\begin{array}{r}
 A = l \times w \qquad 3,134 \\
 A = 3,134 \times 2,568 \times \frac{2,568}{2,568} \\
 A = 8.0 \times 10^6 \\
 \qquad \qquad \qquad 18804 \\
 \qquad \qquad \qquad 15670 \\
 \qquad \qquad \qquad +6268 \\
 \hline
 8048112 = 8.0 \times 10^6
 \end{array}$$

What is the area of a circle that has a radius of 14.7 ft.? Write your answer using scientific notation and with 2 sig figs.

6.8×10^2 sq. ft.

$$\begin{array}{r}
 14.7 \qquad 216.09 \\
 A = \pi r^2 \qquad \times 14.7 \qquad \times 3.14 \\
 A = 3.14(14.7) \qquad 1029 \qquad 86436 \\
 A = 3.14(216.09) \qquad 588 \qquad 21609 \\
 A = 6.8 \times 10^2 \qquad +147 \qquad +64827 \\
 \hline
 216.09 \qquad 678.5226 = 6.8 \times 10^2
 \end{array}$$

What is the area of a triangle that has a base of 4.73×10^2 ft. and a height of 2.06×10^2 ft.? Write your answer using scientific notation and with 2 sig figs.

4.9×10^4 sq. ft.

$$\begin{array}{r}
 A = \frac{1}{2}bh \qquad 473 \\
 A = \frac{1}{2} \times 473 \times 206 \qquad \times 103 \\
 \qquad \qquad \qquad 1419 \\
 A = 103 \times 473 \qquad +4730 \\
 \hline
 A = 4.9 \times 10^4 \qquad 48719 = 4.9 \times 10^4
 \end{array}$$

Exercise 91

(1 acre equals 43,560 square feet, and 1 square mile equals 640 acres.)

4 sq. yd. = 36 sq. ft. 2.5 acres = 108,900 sq. ft. 18 sq. ft. = 2 sq. yd.
 720 sq. in. = 5 sq. ft. 81 sq. ft. = 9 sq. yd. 7 sq. yd. = 63 sq. ft.
 $.4$ acre = 17,424 sq. ft. 5 sq. mi. = 3,200 acres $\frac{3}{4}$ acre = 32,670 sq. ft.

Exercise 92

(The measure of the content or capacity of a solid figure is called volume. The formula for the volume of a cube is $V = e^3$.)

Find the volume of each cube. If necessary, round off to the nearest hundredth.

$$\begin{array}{llll}
 e = 3 \text{ ft. } 27 \text{ cu. ft.} & e = 6 \text{ in. } 216 \text{ cu. in.} & e = 3.5 \text{ yd. } 42.88 \text{ cu. yd.} & e = 15 \text{ in. } 3,375 \text{ cu. in.} \\
 e = 10 \text{ in. } 1,000 \text{ cu. in.} & e = 3\frac{1}{4} \text{ ft. } 34.33 \text{ cu. ft.} & e = 2\frac{1}{2} \text{ ft. } 15.63 \text{ cu. ft.} & e = 5.8 \text{ cm } 195.11 \text{ cm}^3 \\
 & \text{or } 34\frac{21}{64} \text{ cu. ft.} & \text{or } 15\frac{5}{8} \text{ cu. ft.} &
 \end{array}$$

Exercise 93

(The formula for the volume of a rectangular solid is $V = lwh$.)

Find the volume of each rectangular solid.

$$\begin{array}{llll}
 l = 14 \text{ ft.} & l = 15 \text{ ft.} & l = 23 \text{ in.} & l = 11 \text{ ft.} \\
 w = 9 \text{ ft.} & w = 12 \text{ ft.} & w = 18 \text{ in.} & w = 10 \text{ ft.} \\
 h = 12 \text{ ft. } 1,512 \text{ cu. ft.} & h = 8 \text{ ft. } 1,440 \text{ cu. ft.} & h = 25 \text{ in. } 10,350 \text{ cu. in.} & h = 7\frac{1}{2} \text{ ft. } 825 \text{ cu. ft.}
 \end{array}$$

Find the volume of each cube. If necessary, round off to the nearest hundredth.

$$\begin{array}{llll}
 e = 5 \text{ in. } 125 \text{ cu. in.} & e = 1\frac{3}{4} \text{ ft. } 5.36 \text{ cu. ft.} & e = 3\frac{2}{3} \text{ ft. } 49\frac{8}{27} \text{ cu. ft.} & e = 2.4 \text{ cm } 13.82 \text{ cm}^3 \\
 & \text{or } 5\frac{23}{64} \text{ cu. ft.} & &
 \end{array}$$

Exercise 94

Change to cubic feet.

$$4 \text{ cu. yd. } 108 \text{ cu. ft.} \quad 6,912 \text{ cu. in. } 4 \text{ cu. ft.} \quad 2\frac{1}{2} \text{ cu. yd. } 67.5 \text{ cu. ft.} \quad 10 \text{ cu. yd. } 270 \text{ cu. ft.}$$

Change to cubic inches.

$$5 \text{ cu. ft. } 8,640 \text{ cu. in.} \quad 1\frac{1}{2} \text{ cu. ft. } 2,592 \text{ cu. in.} \quad 1 \text{ cu. yd. } 46,656 \text{ cu. in.} \quad 10 \text{ cu. ft. } 17,280 \text{ cu. in.}$$

Exercise 95

A rectangle has a length of 30 cm and a width of 10 cm. If each dimension is increased by 10%, by what percent is the area of the original rectangle increased? 21%

Using the information concerning the above rectangle, by what percent is the perimeter of the original rectangle increased? 10%

A cube has a volume of 216 cu. in. What is the length of each edge? 6 in.

$$\begin{array}{ll}
 300 \text{ cm}^2 & 33 \times 11 = 363 \text{ cm}^2 \\
 \frac{363}{300} & \frac{63}{300} = \frac{21}{100} = 21\% \\
 - \frac{300}{63} & \\
 80 \text{ cm} & 66 + 22 = 88 \text{ cm} \\
 \frac{88}{80} & = \frac{11}{10} = 10\%
 \end{array}$$

$$\begin{array}{l}
 V = e^3 \\
 216 = e^3 \\
 \sqrt[3]{216} = \sqrt[3]{e^3} \\
 6 = e
 \end{array}$$

Exercise 96

$$7\frac{3}{8} + 4\frac{5}{6} + 8\frac{5}{12} = 20\frac{5}{8} \quad 12\frac{2}{3} - 6\frac{3}{7} = 6\frac{5}{21} \quad 8\frac{1}{2} + 17\frac{2}{3} + 12\frac{1}{6} = 38\frac{1}{3}$$

$$21\frac{1}{5} - 18\frac{1}{2} = 2\frac{7}{10} \quad 5 - 4\frac{3}{5} = \frac{2}{5} \quad 3\frac{1}{2} \times \frac{2}{3} = 2\frac{1}{3} \quad 7\frac{1}{2} \times 1\frac{1}{6} = 8\frac{3}{4}$$

$$1\frac{1}{4} \times 12 = 15 \quad 2\frac{2}{3} \div 1\frac{5}{9} = 1\frac{5}{7} \quad \frac{2}{3} \div \frac{5}{6} = \frac{4}{5} \quad \frac{20}{4\frac{1}{2}} = 4\frac{4}{9}$$

Order the decimals in each row from least to greatest.

.067	.7	1.36	.702	.071	.026
.026	.067	.071	.7	.702	1.36
.81	.008	.819	.82	.081	.801
.008	.081	.801	.81	.819	.82

Exercise 97 (quiz—8 each)

$$8.99 + 0.67 - 3.784 = 5.876 \quad 81.74 - 13.895 + 79.44 = 147.285 \quad 11.8954 + 4.884 + 0.783 = 17.5624$$

$$.0785 \times .4 = .0314 \quad 950 \times .005 = 4.75 \quad 9\frac{4}{5} \times \frac{5}{7} = 7$$

$$.703 \div 1.9 = .37 \quad 570 \div 100 = 5.7 \quad 5\frac{5}{11} \div 2\frac{2}{5} = 2\frac{3}{11}$$

$$3\frac{2}{3} + 4\frac{4}{5} = 8\frac{7}{15} \quad .002 \times .001 = .000002 \quad 15\frac{7}{9} - 6\frac{2}{3} = 9\frac{1}{9}$$

Exercise 98

12 is what % of 15? 80% 48% of 180 = 86.4 20% of what number is 16? 80

Write $37\frac{1}{2}\%$ as a fraction. $\frac{3}{8}$ Write 91% as a ratio. 91:100

Subtract 74% from 100%. 26% Write $\frac{7}{8}$ as a percent. 87.5%

Add 12% to 46%. 58% Write $71\frac{5}{8}\%$ as a decimal. .71625

Exercise 99

Solve for x . x must be an integer.

$$6(2x + 4) = 120 \quad \frac{3}{4}x = \sqrt{36} \quad 2x + 6 = 5x - 9$$

$$10 > (2x + 3) > 8 \quad 11 > \frac{x}{5} > 9 \quad 15 \geq (5x + 6) \geq 11$$

Exercise 100

A city that is considering a 1¢ sales tax conducted a survey of 1,000 citizens. The results of the survey were as follows.

Favor — 318

Oppose — 492

Undecided—190

What percent oppose the sales tax? 49.2%

If 60% of those undecided later favor the tax, what percent now favor the tax? 43.2%

$$\begin{array}{r} 190 \\ \times .6 \\ \hline 114.0 \end{array} + \begin{array}{r} 318 \\ + 114 \\ \hline 432 \end{array} = 43.2\%$$

Of those who oppose the tax, only 25% take the time to go to the polls and vote against the tax. How many of the 492 voted against the tax? 123

$$\frac{1}{4} \text{ of } 492 = 123$$

In the election, only 14% of the city's 97,500 registered voters voted. The sales tax passed by 150 votes. How many voted against the tax? $6,750$

$$\begin{array}{r} 97,500 \\ \times .14 \\ \hline 13,650.00 \end{array} \quad \begin{array}{r} 13,650 \\ \times .5 \\ \hline 6,825.0 \end{array} \quad \begin{array}{r} 6,825 \\ - 75 \\ \hline 6,750 \end{array}$$

The 150 margin was what percent of the total votes? Find the answer to the nearest tenth of one percent. 1.1%

$$\frac{150}{13,650} = \frac{3}{273} = \frac{1}{91} \quad 91 \overline{) 1.0000} \quad .0109 = 1.1\%$$

The 150 margin was what percent of the total registered voters? Find the answer to the nearest tenth of one percent. 0.2%

$$\frac{150}{97,500} = \frac{3}{1,950} = \frac{1}{650} \quad 650 \overline{) 1.0015} = 0.2\%$$

Exercise 101

(Two angles with a sum of 90° are complementary angles. Two angles with a sum of 180° are supplementary.)

Write the number of degrees in the complements of the given angles.

$$23^\circ \ 67^\circ \quad 45^\circ \ 45^\circ \quad 56^\circ \ 34^\circ \quad 60^\circ \ 30^\circ \quad 18\frac{1}{2}^\circ \ 71\frac{1}{2}^\circ \quad 45.5^\circ \ 44.5^\circ$$

Write the number of degrees in the supplements of the given angles.

$$87^\circ \ 93^\circ \quad 122^\circ \ 58^\circ \quad 98.5^\circ \ 81.5^\circ \quad 135^\circ \ 45^\circ \quad 113\frac{1}{4}^\circ \ 66\frac{3}{4}^\circ \quad 95.5^\circ \ 84.5^\circ$$

Classify each angle as acute, obtuse, or right.

$$76^\circ \text{ acute} \quad 90^\circ \text{ right} \quad 114^\circ \text{ obtuse} \quad 93^\circ \text{ obtuse} \quad 89^\circ \text{ acute} \quad 15^\circ \text{ acute}$$

Exercise 102

(The sum of the three angles in a triangle is 180° .)

Write the number of degrees in the third angle of a triangle.

$$45^\circ; 45^\circ \ 90^\circ \quad 30^\circ; 70^\circ \ 80^\circ \quad 60^\circ; 60^\circ \ 60^\circ \quad 25^\circ; 65^\circ \ 90^\circ \quad 30^\circ; 90^\circ \ 60^\circ \quad 28^\circ; 74^\circ \ 78^\circ$$

Classify each triangle having these angles as acute, obtuse, or right.

$$90^\circ; 30^\circ; 60^\circ \text{ right} \quad 35^\circ; 110^\circ; 35^\circ \text{ obtuse} \quad 60^\circ; 60^\circ; 60^\circ \text{ acute} \quad 45^\circ; 90^\circ; 45^\circ \text{ right}$$

The two base angles of an isosceles triangle each contain twice as many degrees as the third angle. How many degrees are in each angle? (The base angles of an isosceles triangle are congruent.) $x + 2x + 2x = 180$ $36^\circ; 72^\circ; 72^\circ$

The third angle of a triangle contains twice as many degrees as the first angle. The second angle contains 20 more degrees than the first angle. How many degrees are in each angle? $x + x + 20 + 2x = 180$ $40^\circ; 60^\circ; 80^\circ$

Exercise 103

Find the perimeter or circumference. If necessary, round to the nearest hundredth.

Rectangle	Square	Circle	Circle
$l = 25$ ft.	$s = 6\frac{3}{4}$ in. 27 in.	$r = 4\frac{1}{2}$ ft. 28.26 ft.	$d = 6.7$ m 21.04 m
$w = 21$ ft. 92 ft.			

Find the area. If necessary, round to the nearest hundredth.

Rectangle	Triangle	Square	Circle
$l = 27$ ft.	$b = 42$ ft.	$s = 3.75$ in. 14.06 sq. in.	$d = 10$ in. 78.5 sq. in.
$w = 5$ yd. 405 sq. ft.	$h = 19$ ft. 399 sq. ft.	or $14\frac{1}{16}$ sq. in.	
or 45 sq. yd.			

A triangular piece of land has a height of $\frac{1}{2}$ mile and a base of $\frac{3}{4}$ mile.

Find the number of acres. 120 acres

$$A = \frac{1}{2}bh$$

$$A = \frac{1}{2} \cdot \frac{3}{4} \cdot \frac{1}{2} = \frac{3}{16} \times \frac{640}{1} = 120 \text{ acres}$$

$$A = \frac{3}{16} \text{ sq. mi.}$$

If the radius of a circle is 24 inches, what is the diameter?

48 in.

$$d = 2r$$

$$d = 2 \cdot 24$$

$$d = 48 \text{ in.}$$

Exercise 104

Find the area. If necessary, round to the nearest hundredth.

Rectangle	Triangle	Square	Circle
$l = 14$ in.	$b = 20$ ft.	$s = 8.3$ in. 68.89 sq. in.	$r = 6.1$ m 116.84 m ²
$w = 10$ in. 140 sq. in.	$h = 18$ ft. 180 sq. ft.		

Find the area. If necessary, round to the nearest hundredth.

Cube	Rectangular Solid	Cube	Rectangular Solid
$e = 6$ in. 216 cu. in.	$l = 12$ ft.	$e = 1.25$ in. 1.95 cu. in.	$l = 5\frac{3}{4}$ in.
	$w = 9$ ft.	or $1\frac{61}{64}$ cu. in.	$w = 2\frac{1}{2}$ in.
	$h = 8$ ft. 864 cu. ft.		$h = 3\frac{2}{3}$ in. 52.71 cu. in.
			or $52\frac{17}{24}$ cu. in.

An aquarium is 28 inches long, 14 inches wide, and 20 inches high. What is the volume of the aquarium?

7,840 cu. in.

$$V = lwh \quad 560$$

$$V = 28 \times 14 \times 20 \quad \times 14$$

$$V = 560 \times 14 \quad 7,840$$

$$V = 7,840 \text{ cu. in.}$$

How much will it cost to dig a swimming pool that is 25 feet long, 12 feet wide, and 4 feet deep at \$1.20 per cubic foot?

\$1,440

$$V = lwh \quad 1,200$$

$$V = 25 \times 12 \times 4 \quad \times 1.2$$

$$V = 100 \times 12 \quad \$1,440.00$$

$$V = 1,200 \text{ cu. ft.}$$

Exercise 105

Find the area in square feet for a square that has a perimeter of 32 feet. *64 sq. ft.*

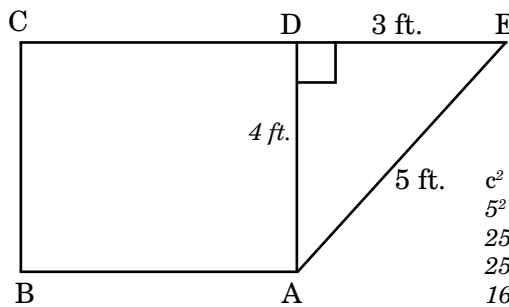
$$\begin{aligned} P &= 4s & A &= s^2 \\ 32 &= 4s & A &= 8^2 \\ \frac{32}{4} &= \frac{4s}{4} & A &= 64 \text{ sq. ft.} \\ 8 &= s \end{aligned}$$

Find the volume in cubic feet for a cube that has a surface area of 96 square feet. (The formula for the surface area of a cube is $SA = 6e^2$.) *64 cu. ft.*

$$\begin{aligned} SA &= 6e^2 & V &= e^3 \\ 96 &= 6e^2 & V &= 4^3 \\ \frac{96}{6} &= \frac{6e^2}{6} & V &= 64 \text{ cu. ft.} \\ 16 &= e^2 \\ \sqrt{16} &= \sqrt{e^2} \\ 4 &= e \end{aligned}$$

A rectangle whose length is twice as long as its width has a perimeter of 60 feet. Find its area in square feet. *200 sq. ft.*

What is the area in square feet for square ABCD? *16 sq. ft.*



$$\begin{aligned} P &= 2l + 2w & A &= lw \\ 60 &= 2(2x) + 2x & A &= 20 \times 10 \\ 60 &= 4x + 2x & A &= 200 \text{ sq. ft.} \\ 60 &= 6x \\ \frac{60}{6} &= \frac{6x}{6} \\ 10 &= x \\ 20 &= 2x \\ A &= s^2 \\ A &= 4^2 \\ A &= 16 \text{ sq. ft.} \\ c^2 &= a^2 + b^2 \\ 5^2 &= 3^2 + b^2 \\ 25 &= 9 + b^2 \\ 25 - 9 &= 9 - 9 + b^2 \\ 16 &= b^2 \\ \sqrt{16} &= \sqrt{b^2} \\ 4 &= b \end{aligned}$$

Exercise 106 (quiz—6 each)

$$\begin{aligned} 7\frac{2}{3} + 6\frac{1}{2} + 8\frac{5}{6} &= 23 & 12\frac{1}{6} - 6\frac{5}{7} &= 5\frac{19}{42} & 13\frac{3}{5} + 8\frac{1}{3} + 7\frac{2}{15} &= 29\frac{1}{15} \\ 13 - 6\frac{2}{5} &= 6\frac{3}{5} & 8,796 \times 5 &= 43,980 & 3\frac{2}{5} \times 4\frac{1}{6} &= 14\frac{1}{6} & 3\frac{5}{9} \div 12 &= \frac{8}{27} \\ 1,506 - 972 &= 534 & 349 + 278 + 625 + 281 &= 1,533 & .007 \times .013 &= .000091 & 976.3 + 804.78 &= 1,781.08 \end{aligned}$$

Find the answer by rounding each term to the nearest tenth. Answers should also be to the nearest tenth.

$$30.1 \times .09 = 3.0 \quad 47.999 \div 1.183 = 40.0 \quad 155.21 \times .11 \times .09 = 1.6 \quad .9 \times .9 \times .9 = .7$$

Exercise 107

Solve each system of equations for x .

$$\begin{cases} x + y = 7 \\ x - y = 9 \end{cases} \quad \begin{cases} x + y = 8 \\ y = x + 2 \end{cases} \quad \begin{cases} x + 2y = 10 \\ 2x - y = 5 \end{cases} \quad \begin{cases} 3x + 2y = 2.60 \\ 2x + 3y = 2.40 \\ 9x + 6y = 7.80 \\ -4x - 6y = -4.80 \\ \hline 5x = 3.00 \\ \frac{5x}{5} = \frac{3.00}{5} \\ x = \$.60 \end{cases}$$

Three apples and 2 oranges cost \$2.60. Two apples and 3 oranges cost \$2.40. How much does 1 apple cost? (Use a system of equations where apples are x and oranges are y .) *\$.60 or 60¢*

Exercise 108

Write a proportion and find each answer. Use this format for the proportion:

$$\frac{\text{percentage}}{\%} = \frac{\text{base}}{100\%}$$

$$125\% \text{ of } 500 \quad \frac{x}{125} = \frac{500}{100}$$

$$x = 625$$

$$83 \text{ is } 50\% \text{ of what number?} \quad \frac{83}{50} = \frac{x}{100}$$

$$x = 166$$

$$7 \text{ is } \frac{1}{2}\% \text{ of what number?} \quad \frac{7}{\frac{1}{2}} = \frac{x}{100}$$

$$x = 1,400$$

$$12\frac{3}{5}\% \text{ of } 400 \quad \frac{x}{12\frac{3}{5}} = \frac{400}{100}$$

$$x = 50\frac{2}{5}$$

$$25 \text{ is what } \% \text{ of } 100? \quad \frac{25}{x} = \frac{100}{100}$$

$$x = 25\%$$

$$9 \text{ is what } \% \text{ of } 30? \quad \frac{9}{x} = \frac{x}{100}$$

$$x = 30\%$$

$$\frac{1}{2}\% \text{ of } 80 \quad \frac{x}{\frac{1}{2}} = \frac{80}{100}$$

$$x = \frac{2}{5}$$

$$11 \text{ is what } \% \text{ of } 22? \quad \frac{11}{x} = \frac{22}{100}$$

$$x = 50\%$$

$$90 \text{ is } 125\% \text{ of what number?} \quad \frac{90}{125} = \frac{x}{100}$$

$$x = 72$$

Exercise 109

Simplify.

$$(+6) - (-4) = 10$$

$$(-3) \times (-2) = 6$$

$$\frac{-16}{-4} = 4$$

$$(-8) + (+7) = -1$$

$$\frac{144}{-12} - 12$$

$$(-8)(-9)(5) = 360$$

$$(12) - (8) = 4$$

$$(-9) - (-6) - (-9) + (-6) = 0$$

$$5^2 = 25$$

$$\sqrt{64} = 8$$

$$\sqrt{7,225} = 85$$

$$8^3 = 512$$

Exercise 110

Brandon made 70% on a math test having 40 problems that counted equally. How many problems did he miss? 12

$$\frac{40}{100} = \frac{x}{30}$$

The arithmetic mean of 5 numbers is 15. When the greatest of the numbers is deleted, the mean of the remaining 4 numbers is 12. What number was deleted from the list of 5? 27

$$100x = 1200$$

$$\frac{100x}{100} = \frac{1200}{100}$$

$$x = 12$$

$$\begin{array}{r} 15 \quad 12 \quad 75 \\ \times 5 \quad \times 4 \quad -48 \\ \hline 75 \quad 48 \quad 27 \end{array}$$

Forty percent of the 25 students in Mr. Dickson's math class drank orange juice for breakfast. Of the 40% who drank orange juice, 20% ate a muffin for breakfast. None of the other students ate a muffin. How many students had a muffin for breakfast? 2

$$\begin{array}{r} 25 \quad 10 \\ \times .4 \quad \times .2 \\ \hline 10.0 \quad 2.0 \end{array}$$

Two angles are complementary angles. The first angle has four times as many degrees as the second angle. How many degrees are in each angle? 18°; 72°

$$4x + x = 90$$

$$5x = 90$$

$$\frac{5x}{5} = \frac{90}{5}$$

$$x = 18^\circ$$

$$4x = 72^\circ$$

Exercise 111

$$12.895 + 3.895 - 0.0895 = 16.7005 \quad 11.8 - 10.8943 + 67.9045 = 68.8102 \quad 0.58943 + 7.865 + 9.05783 = 17.51226$$

$$.01895 \times .25 = .0047375$$

$$.863 \times .009 = .007767$$

$$1,000 \times .7854 = 785.4$$

$$24.702 \div 3.58 = 6.9$$

$$86.3 \div 100 = .863$$

$$6.8 \times 100 \div 10 = 68$$

Write each decimal as a percent.

$$.895 \text{ } 89.5\%$$

$$.064 \text{ } 6.4\%$$

$$6.54 \text{ } 654\%$$

$$.005 \text{ } 0.5\%$$

$$12.6 \text{ } 1,260\%$$

$$1.1 \text{ } 110\%$$

Write each fraction as a decimal.

$$\frac{3}{4} \text{ } .75$$

$$\frac{1}{8} \text{ } .125$$

$$\frac{1}{5} \text{ } .2$$

$$\frac{2}{3} \text{ } .\bar{6}$$

$$\frac{7}{8} \text{ } .875$$

$$\frac{1}{6} \text{ } .\bar{16}$$

Exercise 112

Write the square root.

$$\sqrt{100} \text{ } 10$$

$$\sqrt{64} \text{ } 8$$

$$\sqrt{4} \text{ } 2$$

$$\sqrt{25} \text{ } 5$$

$$\sqrt{121} \text{ } 11$$

$$\sqrt{1} \text{ } 1$$

Evaluate if $a = \sqrt{81}$, $b = \sqrt{49}$, and $c = \sqrt{16}$.

$$abc = 252$$

$$.5ab = 31.5$$

$$2a - 3b + \frac{1}{2}c = -1$$

$$5c - \frac{2}{3} = 19\frac{1}{3}$$

Extract the square root.

$$\sqrt{529} \text{ } 23$$

$$\sqrt{4,225} \text{ } 65$$

$$\sqrt{2,116} \text{ } 46$$

$$\sqrt{961} \text{ } 31$$

$$\sqrt{8,649} \text{ } 93$$

Exercise 113

Evaluate if $x = 6$, $y = -3$, and $z = 0$.

$$3x^2 + y = 105$$

$$2(xy + z) = -36$$

$$x^3y^2z = 0$$

$$x + 3(y^2 - z) = 33$$

$$y^2 - x = 3$$

$$y^x = 729$$

Write as a positive power.

$$y^{-2} \frac{1}{y^2}$$

$$z^{-3} \frac{1}{z^3}$$

$$2^{-3} \frac{1}{2^3}$$

$$x^{-8} \frac{1}{x^8}$$

$$\frac{1}{5^{-2}} 5^2$$

$$\frac{1}{x^{-3}} x^3$$

$$\frac{1}{3^{-5}} 3^5$$

$$\frac{1}{a^{-3}} a^3$$

Exercise 114

Write the number of degrees in the complements of the given angles.

$$78^\circ \text{ } 12^\circ$$

$$54^\circ \text{ } 36^\circ$$

$$27^\circ \text{ } 63^\circ$$

$$19^\circ \text{ } 71^\circ$$

$$33\frac{4}{5}^\circ \text{ } 56\frac{1}{5}^\circ$$

$$68.5^\circ \text{ } 21.5^\circ$$

Write the number of degrees in the supplements of the given angles.

$$102^\circ \text{ } 78^\circ$$

$$158^\circ \text{ } 22^\circ$$

$$47^\circ \text{ } 133^\circ$$

$$69^\circ \text{ } 111^\circ$$

$$120\frac{1}{2}^\circ \text{ } 59\frac{1}{2}^\circ$$

$$88.6^\circ \text{ } 91.4^\circ$$

Write the number of degrees in the third angle of a triangle.

$$25^\circ; 75^\circ \text{ } 80^\circ$$

$$28^\circ; 62^\circ \text{ } 90^\circ$$

$$90^\circ; 50^\circ \text{ } 40^\circ$$

$$56^\circ; 79^\circ \text{ } 45^\circ$$

$$27^\circ; 73^\circ \text{ } 80^\circ$$

$$44^\circ; 82^\circ \text{ } 54^\circ$$

Two angles are supplementary. One angle is 18° greater than the other.

Find the measure of the two angles. $81^\circ; 99^\circ$

$$x + x + 18 = 180$$

$$2x + 18 - 18 = 180 - 18$$

$$2x = 162$$

$$\frac{2x}{2} = \frac{162}{2}$$

$$x = 81^\circ$$

$$x + 18 = 99^\circ$$

Exercise 115

A rectangle is 3 feet longer than it is wide. If the perimeter is 30 feet, find the area in square feet. *54 sq. ft.*

$$A = lw$$

$$A = 9.6$$

$$A = 54 \text{ sq. ft.}$$

The diameter of a circle is represented as x . How should the radius of the same circle be represented? $\frac{x}{2}$

Find the measure of each angle in a triangle if the first angle measures 3 degrees more than the second angle which contains the same number of degrees as the third angle. $62^\circ; 59^\circ; 59^\circ$

$$P = 2l + 2w$$

$$30 = 2(x + 3) + 2x$$

$$30 = 2x + 6 + 2x$$

$$30 - 6 = 4x + 6 - 6$$

$$24 = 4x$$

$$\frac{24}{4} = \frac{4x}{4}$$

$$6 = x$$

$$9 = x + 3$$

$$x + 3 + x + x = 180$$

$$3x + 3 - 3 = 180 - 3$$

$$3x = 177$$

$$\frac{3x}{3} = \frac{177}{3}$$

$$x = 59^\circ$$

$$x + 3 = 62^\circ$$

Alice Smith bought a clothes dryer that retailed for \$325. She received a 15% discount because she works at the store where she bought the dryer. What was her cost after paying a $7\frac{1}{2}\%$ sales tax? *\$296.97*

$$\$325$$

$$\times .85$$

$$\underline{1625}$$

$$2600$$

$$\$276.25$$

$$\$276.25$$

$$\times 1.075$$

$$\underline{138125}$$

$$193375$$

$$+ 276250$$

$$\underline{\$296.96875 = \$296.97}$$

Exercise 116 (quiz—6 each)

$$125\frac{1}{4}\% \text{ of } 50 = 62.625$$

$$12 \text{ is } 75\% \text{ of what number? } 16$$

$$150 \text{ is } 120\% \text{ of what number? } 125$$

$$28 \text{ is what } \% \text{ of } 140? 20\%$$

$$13\frac{1}{5}\% \text{ of } \$40 = \$5.28$$

$$18 \text{ is what } \% \text{ of } 9? 200\%$$

$$54\% \text{ of } \$500 = \$270$$

$$9\frac{1}{2}\% \text{ of } \$750 = \$71.25$$

$$12\% \text{ of } 2,000 = 240$$

$$10\% \text{ of } \$65 = \$6.50$$

$$15\% \text{ of } \$400 = \$60$$

$$20\% \text{ of } \$88 = \$17.60$$

Write each decimal as a percent.

$$.95 \text{ } 95\%$$

$$.03 \text{ } 3\%$$

$$1.56 \text{ } 156\%$$

$$.009 \text{ } 0.9\%$$

$$2.2 \text{ } 220\%$$

Exercise 117

Solve for x .

$$-3(x - 6) = 9 \quad 3$$

$$4x - (2 - 2x) = 28 \quad 5$$

$$3x + 7 = 5x - 9 \quad 8$$

$$ax - 3 = 9 \quad x = \frac{12}{a}$$

$$a(x + 3) - 7 = 4 \quad x = \frac{11 - 3a}{a}$$

$$-x + 3 = ax - 5 \quad x = \frac{8}{a + 1}$$

$$\text{or } \frac{11}{a} - 3$$

Concrete is to be mixed using cement and sand in the ratio 2:5. How much sand will be required to mix with 96 pounds of cement? Use a proportion to solve. *240 lb.*

$$\frac{2}{5} = \frac{96}{x}$$

$$2x = 480$$

$$\frac{2x}{2} = \frac{480}{2}$$

$$x = 240 \text{ lb.}$$

Exercise 118

Find the simple interest.

$$p = \$4,000; r = 10\%; t = 1 \text{ yr. } \$400$$

$$p = \$1,350; r = 9\frac{3}{4}\%; t = 1 \text{ yr. } \$131.63$$

$$p = \$975; r = 13\frac{1}{2}\%; t = 9 \text{ mo. } \$98.72$$

$$p = \$2,000; r = 14\frac{3}{4}\%; t = 2 \text{ yr. } \$590$$

$$p = \$500; r = 6\%; t = 3 \text{ mo. } \$7.50$$

$$p = \$1,250; r = 12\frac{1}{2}\%; t = 6 \text{ mo. } \$78.13$$

Exercise 119

Write using scientific notation.

$$6,895,000 \quad 6.895 \times 10^6 \quad .000675 \quad 6.75 \times 10^{-4} \quad .0083 \quad 8.3 \times 10^{-3} \quad 7,000,000,000 \quad 7.0 \times 10^9$$

$$89,600,000 \quad 8.96 \times 10^7 \quad .00000732 \quad 7.32 \times 10^{-6} \quad .008754 \quad 8.754 \times 10^{-3} \quad .013 \quad 1.3 \times 10^{-2}$$

$$280,000 \quad 2.8 \times 10^5 \quad .000215 \quad 2.15 \times 10^{-4} \quad 324,000,000 \quad 3.24 \times 10^8 \quad 4,500 \quad 4.5 \times 10^3$$

Exercise 120

How many cubic inches are contained in a box that is 2 ft. long, 1 ft. wide, and 1 ft. high? *3,456 cu. in.*

$$\begin{aligned} V &= lwh && 1,728 \\ V &= 2 \cdot 1 \cdot 1 && \times 2 \\ V &= 2 \text{ cu. ft.} && 3,456 \text{ cu. in.} \end{aligned}$$

Write the probability that the letter *B* will be the first letter in a license plate. $\frac{1}{26}$

The radius of a circle is 10 in. What is the diameter, area, and circumference of the circle? *20 in.; 314 sq. in.; 62.8 in.*

$$\begin{aligned} d &= 2r & A &= \pi r^2 & C &= 2\pi r \\ d &= 2 \times 10 & A &= 3.14(10)^2 & C &= 2 \times 3.14 \times 10 \\ d &= 20 \text{ in.} & A &= 3.14(100) & C &= 20 \times 3.14 \\ & & & & & A = 314 \text{ sq. in. } C = 62.8 \text{ in.} \end{aligned}$$

Emily Brooks bought a china cabinet for \$1,500. She paid \$350 down and agreed to pay the remainder in 15 monthly installments of \$82.50 each. How much interest did she have to pay? *\$87.50*

$$\begin{array}{r} \$82.50 \\ \times 15 \\ \hline 41250 \\ \underline{8250} \\ 1,237.50 \\ + 350 \\ \hline \$1,587.50 \\ - 1,500 \\ \hline \$87.50 \end{array}$$

The distance between two rivers is 475 miles. A map that represents the rivers uses the scale 1 in. = 100 mi. How far apart should the rivers be on the map?

$$\begin{array}{r} 1,237.50 \\ + 350 \\ \hline \$1,587.50 \end{array}$$

$4\frac{3}{4}$ or 4.75 in.

$$\begin{aligned} \frac{1}{100} &= \frac{x}{475} \\ 100x &= 475 \\ \frac{100x}{100} &= \frac{475}{100} \\ x &= 4.75 \text{ in.} \end{aligned}$$

Practice Exercise Score Sheet

First Grading Period		Second Grading Period	
<u>Quiz</u>	<u>Score</u>	<u>Quiz</u>	<u>Score</u>
1	_____	4	_____
2	_____	5	_____
3	_____	6	_____
Total	_____	Total	_____
Average (total ÷ 3)	_____ (Enter average on first Progress Report.)	Average (total ÷ 3)	_____ (Enter average on second Progress Report.)
Third Grading Period		Fourth Grading Period	
<u>Quiz</u>	<u>Score</u>	<u>Quiz</u>	<u>Score</u>
7	_____	10	_____
8	_____	11	_____
9	_____	12	_____
Total	_____	Total	_____
Average (total ÷ 3)	_____ (Enter average on third Progress Report.)	Average (total ÷ 3)	_____ (Enter average on fourth Progress Report.)

Plane Geometry

Appendix B

Home Teacher Materials Overview

Contact Information

Progress Reports

Appendix B

Home Teacher Materials Overview

Introduction

This section gives additional information about Abeka Academy policies and procedures to help you with grading, recording,

and submitting your student's work in the **accredited program**. Please read all of the following information.

General Information

Course Requirements

1. Current edition textbooks are required for students in Abeka Academy accredited program. This will ensure that students are able to follow along with all video instructions, including quizzes and tests.
2. For academic credit to be granted, a student must complete all courses in which he is enrolled. This includes watching all video lessons. A grade level may not be completed in less than six months.
3. Requests to change the enrollment (switching from Accredited to Independent Study [Unaccredited]) must be processed by our office. Please contact us if you have any questions regarding your student's enrollment.
4. **You must receive approval from Abeka Academy to drop a course** (only available in grades 9–12). Request must be made within thirty days of your assigned begin date for no academic penalty. **Courses dropped after thirty days or without approval will receive a “withdrawn failing” grade.**
5. Because Abeka Academy's primary objective is to provide a distinctively Christian distance-learning education,

Bible is a required course. Grades will not be issued in other courses unless Bible work is received for that grading period. The Authorized King James Version is used for all Bible courses and verse memorization.

6. Abeka Academy provides video instruction for 170 days giving you the opportunity to plan instruction, review, or enrichment specific to your student's need for the remaining 10 days to complete a standard 180-day school year. The 10 extra days should be used throughout the year for added instruction, additional review, field trips, or other special events of academic benefit. Time could also be allotted for standardized testing available through abeka.com.

Communication

Abeka Academy sends important communication by email. Please regularly check the email address that you provided for information related to your student's progress. If you are concerned you might not be receiving email from Abeka Academy, check your junk email folder or contact Abeka Academy to check your email address on file. See p. B7 for contact information.

Getting Started

Responsibilities of the Home Teacher

For the school year to run smoothly, it is important that you read the introductory information in the front of this manual and follow the instructions in the Daily Guides. At the end of each quarter, you will need to organize and mail (or submit online) your student's Progress Reports. (See Academic Calendar at academy.abeka.com.)

Student Schedule

You and your student may arrange the

order of classes as you prefer. We have found the order listed below to be best for most students.

- | | |
|------------|--------------|
| 1. Bible | 4. Science |
| 2. Math | 5. History |
| 3. English | 6. Electives |

To avoid lengthening the school day, have your student do his homework at the end of the day rather than after each class.

You may want to **view the first day's video lesson** and watch the first two weeks of

lessons with your student to become familiar with the procedures the video teachers use and to ensure that your student is developing correct study habits.

Semester exams are generally scheduled in lessons 85 and 170. You may want to allow one or more additional days after these lessons so that no more than two exams are taken in a single day.

Grading Policies

Administering Quizzes, Tests, and Exams

Quizzes are important for three reasons:

1. To evaluate mastery of recent material
2. To determine whether your student is understanding his work and reading
3. To effectively motivate your student to learn

For all mathematics courses, have your student show his work on all quizzes, tests, and exams. Attach any additional paper to tests and exams. **Any problem that requires computation must have work shown to illustrate the student's understanding of the process, even if the student could solve the problem mentally. If work is not shown, points will be deducted.**

Be sure to administer all pages of a test or exam, front and back. When your student has finished a test or exam, check for incomplete sections. It is the student's responsibility to complete all pages of each test and exam.

Handling Graded Materials

Quizzes, tests, exams, and answer keys are to be opened, administered, and stored only by you. They should not be left where your student will have access to them. **Your student may not use the video manuals to plan his work.** Keep all quizzes, tests, and exams in a locked location.

A student who cheats robs himself of a good education, and a home teacher who allows quizzes, tests, exams, or answer keys to be available to a student does great harm to the student's character.

Written Assignments

Require neat, legible work from your student. Do not accept messy work. Have him recopy any work that is poorly written or has too many corrections. Please have your student follow these procedures:

- **Write in pencil** for math.
- **When a mistake is made in math work,** erase and rewrite.

Because it is of the utmost importance to teach your student to be absolutely honest, follow these guidelines in giving a quiz, a test, or an exam.

- **Completely read the instructions** for Giving / Grading Quizzes and Tests in the front of this manual.
- **Remove the quizzes, tests, and exams** from the book before the student takes them.
- **Closely supervise** all assessment periods. Do not leave your student alone with his materials.
- **Be sure all course materials** are out of sight while the student takes the quiz, test, or exam. **Open-book quizzes / tests are not allowed.**
- **Do not** help your student with answers or procedures on any quiz, test, or exam. If he needs any assistance at all, it should be only to explain the directions if he does not understand them. His work must be his own.
- **Quizzes, tests, and exams** cannot be retaken. If you think your student is not prepared, give extra help before the assessment is taken.

Grading

When grading student work, please remember the following:

- **Grade quizzes, tests, and exams** using the point values given in the Daily Guides, appendices, or teacher keys.
- **Graded original tests and ungraded exams** (not copies) must be sent to the Abeka Academy office with the Progress Report.
- **Write the numerical grade** on the top of the test page and on the Progress Report before sending it to Abeka Academy.

- **If you have a question** on one of your student's answers, put a question mark instead of a grade on the Progress Report. On the test, make a note of your question.
- **Subtract 1 point** for each spelling error, up to 5 points for all quizzes and tests.

Grading Scale

A+	98–100	B	83–86	C–	70–72
A	93–97	B–	80–82	D+	67–69
A–	90–92	C+	77–79	D	60–66
B+	87–89	C	73–76	F	0–59

Progress Reports

Two sets of Progress Reports are included in this appendix. They provide a convenient way for you to organize the grades and material that you must send to our office. The Progress Report must be sent to Abeka Academy as soon as the grading period is completed. (See Academic Calendar at academy.abeka.com for expected schedule.)

The Home Teacher's Progress Reports are included for your records. If for some reason Abeka Academy does not receive the Progress Report, your copies will be *the only record of the student's work*. It is imperative that you take the following precautions:

- **Enter all grades on both sets of Progress Reports** before mailing the report.
- **Promptly mail Progress Reports** at the end of each grading period.
- **Keep all Home Teacher's Progress Reports** permanently.

If these guidelines are not followed and work is not received, no grades or transcripts will

be issued, and the student will be required to repeat the course.

Progress Reports should include the following items:

- Progress Report sheet with all information entered
- All original graded tests and ungraded exams for the course
- Any item which the Progress Report sheet directs to "check that this item is enclosed"

Please note the following:

- **Send a Progress Report** only when all items on the Progress Report have been completed. Do not include student work with DVD returns.
- **Include all items** requested on each Progress Report sheet, or the grade will be lowered accordingly. Quizzes are NOT sent with the Progress Report sheet.
- **Return DVDs** (if applicable) as soon as all items on the final Progress Report have been completed. Full-year courses have three sets of DVDs.

Upon receipt of each Progress Report, Abeka Academy will validate your student's work, adjusting grades as needed to meet accredited requirements. Once all work is validated, you may check your student's grade online at academy.abeka.com.

Contact our office if a report card is not received within six weeks. Final report cards and transcripts cannot be completed until all work and all DVDs (if applicable) are received.

Additional Plane Geometry Information

Partial Credit

Partial credit can be given where earned on individual questions when grading quizzes and tests.

Calculators

Two important skills to be developed in mathematics are accuracy and computational speed. Because of this, calculators are *not* to be used in mathematics courses unless the teacher specifically says they may be used.

Practice Exercises

Beginning in lesson 11, your student is assigned to complete Practice Exercises daily. These exercises are located in *Plane Geometry Practice Exercises* book. Each quarter, the Daily Guides list three designated practice exercises that are counted as quiz grades. You will need to keep a record of each practice exercise quiz grade on the Practice Exercise Score Sheet on p. A35 of this manual. At the end of each quarter, average the three quiz grades together. Record the average score on the Progress Report form.

Constructions

In order to ensure accurate construction, the compass and straightedge must be used. Students are not learning the proper method of constructions if they are only sketching. If a compass is not used, the construction will be counted wrong.

Tests

You will grade Tests 1, 2, 4, 5, 7, 8, 10, and 11 and send them to the Abeka Academy office. Record test grades on the appropriate Progress Report.

Exams (Tests 3, 6, 9, and 12) are to be sent to the Abeka Academy office with the appropriate Progress Report to be graded.

Second Semester

Second-semester students should begin with lesson 86. The following questions will be omitted from the final examination for students taking only the second semester—1, 3, 5, 6, 8, 18–20, 27, 29, 30, 34, 35, 37–40, 48, 49, 55, 56, and 69–72.

How Can We Help You?

Contact Information

We are interested in helping your student successfully complete his work. Please let us know early if any problems are encountered. Enrollment, customer service, and grading agents are available to help with all your questions.

You may contact Abeka Academy by one of the following methods:

 Online: abeka.com/ContactInfo

 Email: ABAsecondary@abeka.com

 Phone: U.S. and Canadian Inquiries 1-800-874-3592
International Inquiries 1-850-479-6585

 Mail: For Progress Reports and office correspondence only:

USPS

Abeka Academy
PO Box 17600
Pensacola, FL 32522-7750
USA

Other Carriers

Abeka Academy
240 Waveland St.
Suite A
Pensacola, FL 32503

Accredited students send Progress Reports to the address below. Do not send with any DVD or book returns. Independent Study (Unaccredited) students should keep these reports for their own records.



**PLANE GEOMETRY
Progress Report**

First Grading Period
Lessons 1-44
641J

Account No.

Student ID No.

Student Name _____
Last First Middle

Home Teacher _____

Mailing Address _____

City _____ State _____

Country/ZIP Code _____

Abeka Academy
PO Box 17600
Pensacola, Florida 32522-7750

Date _____

Phone Number _____

Check if the above is a change of address for

- Shipping Mailing Billing Phone

<p>Home Teacher: All student work sent to our office becomes the unconditional property of Abeka Academy and is not returned to you.</p> <p>Did you remember to:</p> <ul style="list-style-type: none"> Subtract the number of wrong points from 100? Record numerical grades on lines? Attach all tests to this report? (It is not necessary to send quizzes.) Sign the video statement if you are able? <p>*To be graded by the Abeka Academy office; please check (✓) that this item is enclosed.</p>	<p>QUIZZES</p> <table border="1"> <thead> <tr> <th>Lesson</th> <th>Quiz</th> <th>Grade</th> </tr> </thead> <tbody> <tr><td>4</td><td>1</td><td>_____</td></tr> <tr><td>8</td><td>2</td><td>_____</td></tr> <tr><td>10</td><td>3</td><td>_____</td></tr> <tr><td>13</td><td>4</td><td>_____</td></tr> <tr><td>17</td><td>5</td><td>_____</td></tr> <tr><td>19</td><td>6</td><td>_____</td></tr> <tr><td>21</td><td>7</td><td>_____</td></tr> <tr><td>23</td><td>8</td><td>_____</td></tr> <tr><td>27</td><td>9</td><td>_____</td></tr> <tr><td>32</td><td>10</td><td>_____</td></tr> <tr><td>34</td><td>11</td><td>_____</td></tr> <tr><td>37</td><td>12</td><td>_____</td></tr> <tr><td>41</td><td>13</td><td>_____</td></tr> </tbody> </table>	Lesson	Quiz	Grade	4	1	_____	8	2	_____	10	3	_____	13	4	_____	17	5	_____	19	6	_____	21	7	_____	23	8	_____	27	9	_____	32	10	_____	34	11	_____	37	12	_____	41	13	_____	<p>TESTS: Any math problem that requires computation must have work shown to illustrate the student's understanding of the process, even if the student could solve the problem mentally. If work is not shown, points will be deducted.</p> <table border="1"> <thead> <tr> <th>Lesson</th> <th>Test</th> <th>Grade</th> </tr> </thead> <tbody> <tr><td>14</td><td>1</td><td>_____</td></tr> <tr><td>29</td><td>2</td><td>_____</td></tr> <tr> <th>Lesson</th> <th>Exam*</th> <th>Check (✓)</th> </tr> <tr><td>44</td><td>3</td><td>()</td></tr> </tbody> </table>	Lesson	Test	Grade	14	1	_____	29	2	_____	Lesson	Exam*	Check (✓)	44	3	()
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19

I personally verify that the student has watched all video lessons in this grading period and that all graded work was completed by the student under a proctor's supervision without any assistance or study materials. I understand that all grades are final following the validation of the work included in this packet and that all work submitted becomes the unconditional property of Abeka Academy and will not be returned.

Home Teacher's signature _____

Student's signature _____

You may check your student's grades online at academy.abeka.com.

Accredited students send Progress Reports to the address below. Do not send with any DVD or book returns. Independent Study (Unaccredited) students should keep these reports for their own records.



Home Teacher's Copy

PLANE GEOMETRY

Progress Report

First Grading Period
Lessons 1-44
641J

Account No.

Student ID No.

Student Name _____
Last
First
Middle

Home Teacher _____

Mailing Address _____

City _____ State _____

Date _____

Country/ZIP Code _____

Phone Number _____

Check if the above is a change of address for

- Shipping
 Mailing
 Billing
 Phone

Abeka Academy
 PO Box 17600
 Pensacola, Florida 32522-7750

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**PLANE GEOMETRY
Progress Report**

Second Grading Period
Lessons 45–85
642J

Account No.

Student ID No.

Student Name _____
Last First Middle

Home Teacher _____

Mailing Address _____

City _____ State _____

Country/ZIP Code _____

Abeka Academy
PO Box 17600
Pensacola, Florida 32522-7750

Date _____

Phone Number _____

Check if the above is a change of address for

Shipping Mailing Billing Phone

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Home Teacher's Copy PLANE GEOMETRY Progress Report

Second Grading Period
Lessons 45-85
642J

Account No.

Student ID No.

Student Name _____
Last
First
Middle

Home Teacher _____

Mailing Address _____

City _____ State _____

Date _____

Country/ZIP Code _____

Phone Number _____

Check if the above is a change of address for

- Shipping
 Mailing
 Billing
 Phone

Abeka Academy
PO Box 17600
Pensacola, Florida 32522-7750

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**PLANE GEOMETRY
Progress Report**

Third Grading Period
Lessons 86–130
643J

Account No.

Student ID No.

Student Name _____
Last First Middle

Home Teacher _____

Mailing Address _____

City _____ State _____

Country/ZIP Code _____

Abeka Academy
PO Box 17600
Pensacola, Florida 32522-7750

Date _____

Phone Number _____

Check if the above is a change of address for

Shipping Mailing Billing Phone

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Home Teacher's Copy

PLANE GEOMETRY

Progress Report

Third Grading Period
Lessons 86–130
643J

Account No.

Student ID No.

Student Name _____
Last First Middle

Home Teacher _____

Mailing Address _____

City _____ State _____

Date _____

Country/ZIP Code _____

Phone Number _____

Check if the above is a change of address for

- Shipping Mailing Billing Phone

Abeka Academy
PO Box 17600
Pensacola, Florida 32522-7750

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**PLANE GEOMETRY
Progress Report**

Fourth Grading Period
Lessons 131–170
644J

Account No.

Student ID No.

Student Name _____
Last First Middle

Home Teacher _____

Mailing Address _____

City _____ State _____

Country/ZIP Code _____

Abeka Academy
PO Box 17600
Pensacola, Florida 32522-7750

Date _____

Phone Number _____

Check if the above is a change of address for

- Shipping Mailing Billing Phone

<p>Home Teacher: All student work sent to our office becomes the unconditional property of Abeka Academy and is not returned to you.</p> <p>Did you remember to:</p> <ul style="list-style-type: none"> • Subtract the number of wrong points from 100? • Record numerical grades on lines? • Attach all tests to this report? (It is not necessary to send quizzes.) • Sign the video statement if you are able? <p>*To be graded by the Abeka Academy office; please check (✓) that this item is enclosed.</p>	<p>QUIZZES</p> <table border="1"> <thead> <tr> <th><u>Lesson</u></th> <th><u>Quiz</u></th> <th><u>Grade</u></th> </tr> </thead> <tbody> <tr><td>133</td><td>40</td><td>_____</td></tr> <tr><td>135</td><td>41</td><td>_____</td></tr> <tr><td>136</td><td>42</td><td>_____</td></tr> <tr><td>137</td><td>43</td><td>_____</td></tr> <tr><td>139</td><td>44</td><td>_____</td></tr> <tr><td>144</td><td>45</td><td>_____</td></tr> <tr><td>147</td><td>46</td><td>_____</td></tr> <tr><td>150</td><td>47</td><td>_____</td></tr> <tr><td>153</td><td>48</td><td>_____</td></tr> <tr><td>161</td><td>49</td><td>_____</td></tr> <tr><td>164</td><td>50</td><td>_____</td></tr> </tbody> </table>	<u>Lesson</u>	<u>Quiz</u>	<u>Grade</u>	133	40	_____	135	41	_____	136	42	_____	137	43	_____	139	44	_____	144	45	_____	147	46	_____	150	47	_____	153	48	_____	161	49	_____	164	50	_____	<p>TESTS: Any math problem that requires computation must have work shown to illustrate the student's understanding of the process, even if the student could solve the problem mentally. If work is not shown, points will be deducted.</p> <table border="1"> <thead> <tr> <th><u>Lesson</u></th> <th><u>Test</u></th> <th><u>Grade</u></th> </tr> </thead> <tbody> <tr><td>140</td><td>10</td><td>_____</td></tr> <tr><td>154</td><td>11</td><td>_____</td></tr> <tr> <th><u>Lesson</u></th> <th><u>Exam*</u></th> <th><u>Check (✓)</u></th> </tr> <tr><td>170</td><td>12</td><td>()</td></tr> </tbody> </table>	<u>Lesson</u>	<u>Test</u>	<u>Grade</u>	140	10	_____	154	11	_____	<u>Lesson</u>	<u>Exam*</u>	<u>Check (✓)</u>	170	12	()
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I personally verify that the student has watched all video lessons in this grading period and that all graded work was completed by the student under a proctor's supervision without any assistance or study materials. I understand that all grades are final following the validation of the work included in this packet and that all work submitted becomes the unconditional property of Abeka Academy and will not be returned.

Home Teacher's signature _____

Student's signature _____

You may check your student's grades online at academy.abeka.com.

Accredited students send Progress Reports to the address below. Do not send with any DVD or book returns. Independent Study (Unaccredited) students should keep these reports for their own records.



Home Teacher's Copy

PLANE GEOMETRY

Progress Report

Fourth Grading Period
Lessons 131-170
644J

Account No.

Student ID No.

Student Name _____
Last First Middle

Home Teacher _____

Mailing Address _____

City _____ State _____

Date _____

Country/ZIP Code _____

Phone Number _____

Check if the above is a change of address for

Shipping Mailing Billing Phone

Abeka Academy
PO Box 17600
Pensacola, Florida 32522-7750

Home Teacher:
All student work sent to our office becomes the unconditional property of Abeka Academy and is not returned to you.

Did you remember to:

- Subtract the number of wrong points from 100?
- Record numerical grades on lines?
- Attach all tests to this report? (It is not necessary to send quizzes.)
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