

Introduction

For Parents and Teachers

Mathematics 8 combines proven teaching methods with full-color illustrations to teach students advanced math facts and concepts. It uses practical applications to help students relate to math in the real world. Its incremental approach and spiral review (teaching concepts in small increments and incorporating continuous review) helps students retain what they have learned. The goal is mastery, not just exposure.

How to Use Mathematics 8

Each **unit** begins with a story following the Scout family's summer vacation as they hike and visit businesses along the way. Character-building quotes scattered throughout the textbook stimulate students' minds.

The **header** in each lesson tells which unit and lesson is taught that day. In Units 1-5, it tells which speed drill or mastery drill to administer. Units 6-10 do not have speed drills or mastery drills.

The **colored teaching box** at the beginning of each lesson teaches the new concept, followed by exercises to reinforce the concept. This concept is reviewed again just before *Sharpening Your Skills*.

Applying Your Skills follows the teaching lesson and its exercises. It reviews concepts taught in earlier lessons. Students should be able to work through these exercises independently. A small reference number below the exercise number indicates the page number where the concept was taught.

Sharpening Your Skills drills students in basic computation (using any of the four math operations), fact focus, and mental math. *Fact Focus* drills math terms, geometric formulas, measurement equivalents, and fraction, decimal, and percent equivalents until they are moved to the mastery drills.

Lessons 5, 10, and 16 of Units 1-9 are quiz or test lessons. Most material has been reviewed five times before it is quizzed or tested. Quiz and test lessons include optional additional activities, which are neither reviewed nor tested. They are optional and just for fun. Unit 10 teaches how to write checks and deposit tickets, keep a check register, and balance a check register with a bank statement. There is a test at the end of the Unit 10.

The **Glossary, Reference Charts, and Index** are reference materials to help students work independently.

Mathematics 8 equips students with tools that help them apply math principles to everyday life. It aims to show the beauty in numbers and teach an appreciation for math. We believe that mathematics should help students achieve the ultimate goal—loving, serving, and bringing glory to God.

Course Materials

- **Mathematics 8 Textbook**
- **Student Packet**
 - Worksheets
 - Speed/Mastery Drills
 - Quizzes
 - Tests
- **Teacher's Guide with Resource CD**
- **Full Solution Answer Key**



Unit 3

Mathematics in the Bakeshop

Lesson 1 90

Understanding Probability and
Expressing Levels of Certainty

Lesson 2 93

Plotting and Locating Points
on a Coordinate Plane

Lesson 3 96

Automobile Purchase Costs

Lesson 4 99

Constructing Congruent Triangles

Lesson 5 102

Quiz 1

Lesson 6 103

Finding the Surface Area of Cylinders

Lesson 7 106

Calculating Commission

Lesson 8 109

Expressing Probability as a Ratio

Lesson 9 112

Reading and Constructing
Bar-in-a-Bar Graphs

Lesson 10 115

Quiz 2

Lesson 11 116

Identifying Rational and Irrational Numbers

Lesson 12 119

Graphing Linear Relations

Lesson 13 122

Using the Interest Formula for Partial Years

Lesson 14 125

Solving Fraction Questions; Simplifying
Expressions With Variables and Exponents

Lesson 15 128

Perfect Squares and Irrational Numbers

Lesson 16 131

Test 3

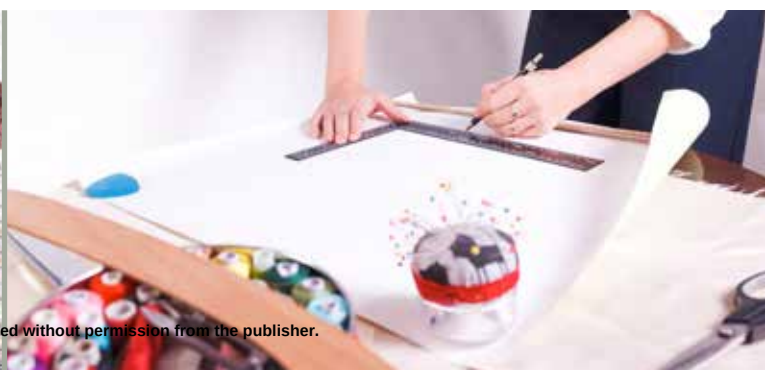




Unit 6

Mathematics in a Fabric Store

Lesson 1	222	Lesson 9	244
Calculating Markup and Selling Price		Reading and Constructing Line Graphs	
Lesson 2	225	Lesson 10	247
Constructing a Triangle From Two Given Sides and a Given Angle (SAS)		Quiz 2	
Lesson 3	228	Lesson 11	248
Finding the Volume of Cones and Pyramids		Distance Between Points on a Coordinate Plane	
Lesson 4	231	Lesson 12	251
Introducing Insurances		Using the Distributive Property to Simplify Multiplication	
Lesson 5	234	Lesson 13	254
Quiz 1		Dividing Expressions With Identical Bases	
Lesson 6	235	Lesson 14	257
Simplifying Expressions With Division Bars		Measuring Electricity: Kilowatt-Hours	
Lesson 7	238	Lesson 15	260
Using the Percent Proportion to Solve Percent Word Problems		Counting Back Change Without a Cash Register	
Lesson 8	241	Lesson 16	263
Combination Probability		Test 6	





Unit 9

Mathematics in the Used Parts Business

Lesson 1 354

Variables on Both Sides of a Complex Equation

Lesson 2 357

Counting Significant Figures

Lesson 3 360

Compound Interest

Lesson 4 363

Paying Vehicle Insurance

Lesson 5 366

Quiz 1

Lesson 6 367

Permutations

Lesson 7 370

Comparing Size and Price to
Find the Best Value

Lesson 8 373

Rounding According to Significant Figures

Lesson 9 376

Constructing and Reading Rectangle Graphs

Lesson 10 379

Quiz 2

Lesson 11 380

Solving Inequalities: Multiplying or
Dividing by a Negative Number

Lesson 12 383

Using Sine, Cosine, and Tangent

Lesson 13 386

Finding the Volume of Irregular Solids

Lesson 14 389

Computing Percentiles

Lesson 15 392

Combining Square Roots

Lesson 16 395

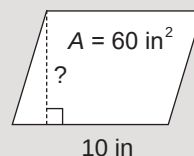
Test 9



Finding the Missing Dimension of Geometric Figures

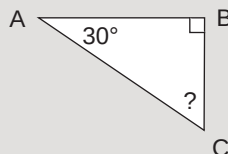
Finding the Missing Dimension of Geometric Figures

A. A missing dimension in a geometric figure can be found by applying the formula for that particular figure. To find the missing dimension, write the formula and replace the variables with the known measurements. Then solve the equation.



$$\begin{aligned} A &= bh \\ 60 &= \frac{10h}{10} \\ 6 &= h \\ h &= 6 \text{ in} \end{aligned}$$

B. To find the missing angle in a triangle, find the sum of the two known angles and subtract it from 180° , which is the sum of the angles of a triangle. Use m in the equation to indicate the measure of the angle.



$$\begin{aligned} m\angle A + m\angle B + m\angle C &= 180^\circ \\ 30 + 90 + m\angle C &= 180^\circ \\ 120 + m\angle C &= 180^\circ \\ -120 &\quad -120 \\ m\angle C &= 60^\circ \end{aligned}$$

Use the formula to calculate the measurement of each figure.

1. circle $C \approx 18.84 \text{ ft}$ $d = \underline{\hspace{2cm}}$
2. parallelogram $A = 288 \text{ cm}^2$ $b = \underline{\hspace{2cm}}$ $h = 16 \text{ cm}$
3. $\triangle GHI$ $m\angle G = \underline{\hspace{2cm}}$ $m\angle H = 65^\circ$ $m\angle I = 35^\circ$
4. $\triangle LMN$ $m\angle L = 45^\circ$ $m\angle M = 90^\circ$ $m\angle N = \underline{\hspace{2cm}}$



Applying Your Skills

Copy and solve.

$$\begin{array}{r} 4 \text{ ft} \quad 2 \text{ in} \\ 7 \text{ ft} \quad 10 \text{ in} \\ 5. + 1 \text{ ft} \quad 5 \text{ in} \\ \hline \end{array}$$

p. 24

$$\begin{array}{r} 14 \text{ hr} \quad 13 \text{ min} \\ 6. - 4 \text{ hr} \quad 20 \text{ min} \\ \hline \end{array}$$

p. 24

$$\begin{array}{r} 7 \text{ lb} \quad 4 \text{ oz} \\ 7. \times \quad \quad 6 \\ \hline \end{array}$$

p. 24

$$\begin{array}{r} 8. 4 \overline{)42 \text{ lb} \quad 12 \text{ oz}} \\ \hline \end{array}$$

p. 24

$$\begin{array}{r} 9. 5 \overline{)36 \text{ hr} \quad 20 \text{ min}} \\ \hline \end{array}$$

p. 24

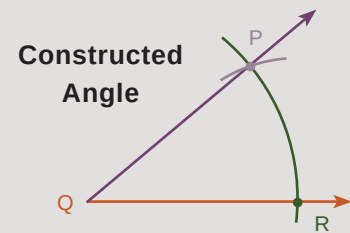
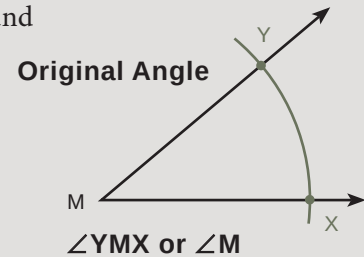
Constructing Congruent Angles

Constructing Congruent Angles

An angle congruent to a given angle can be constructed using a compass and a straightedge. Angles can be labeled by using the three points or only the label of the vertex.

Steps to Construct Congruent Angles

1. Using a straightedge, draw a **ray** and label the endpoint **Q**.
2. On the original angle, place the compass point on the vertex. Draw an arc that intersects both rays. Draw points at both intersections and label them **X** and **Y**.
3. Without changing the compass setting, place the compass point on the endpoint of the **ray** on the angle being constructed. Draw an arc that intersects the **ray**. Draw a point at the intersection and label it **R**.
4. On the original angle, place the compass point on Point **X** and the pencil point on Point **Y**. Without changing the setting, place the compass point on Point **R**. Draw an **arc** that intersects the arc drawn in Step 3. Draw a point at the intersection and label it **P**.
5. Using a straightedge, draw a **ray** to connect points **Q** and **P** to form an angle. Label the angle.



$$\angle PQR \cong \angle YMX$$

$$\angle Q \cong \angle M$$

Angle PQR is congruent to Angle YMX.

Use a compass and a straightedge to construct each congruent angle. Use Worksheet 17.

1. $\angle JAM \cong \angle GEL$

2. $\angle I \cong \angle O$



Applying Your Skills

Copy and simplify.

3. $x^2 \cdot x^2$
p. 134

4. $a^2 \cdot a^2 \cdot a$
p. 134

5. $y^2 \cdot y$
p. 134

6. $2^2 \cdot 2^4$
p. 134

Identify each number as *rational* or *irrational*.

7. 0.73
p. 116, 128

8. $\sqrt{7}$
p. 116, 128

9. $2\frac{4}{9}$
p. 116, 128

10. 3.31662479...
p. 116, 128

Fun With Numbers



Numbers behave in ways that are amazing and mysterious. Mathematicians of the past and present have marveled at the mysteries of numbers that affirm the intelligence of a supernatural Creator. Even though men have discovered many things about numbers, those who know the most realize that much of mathematics is still hidden from human understanding. Our God of the universe made numbers work in ways that only His mind can fully comprehend!

Math Mystery

The sum of two consecutive numbers is equal to the difference in their squares.

$2 + 3 = 5$	$7 + 8 = 15$	$12 + 13 = 25$
$3^2 - 2^2 = n$	$8^2 - 7^2 = n$	$13^2 - 12^2 = n$
$9 - 4 = 5$	$64 - 49 = 15$	$169 - 144 = 25$

Add and then find the difference between the sum and the squares. 

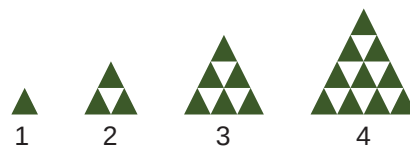
- | | | | |
|--------------|----------------|--------------|--------------|
| 1. $3 + 4$ | 2. $5 + 6$ | 3. $10 + 11$ | 4. $4 + 5$ |
| 5. $27 + 28$ | 6. $105 + 106$ | 7. $35 + 36$ | 8. $25 + 26$ |

Square Numbers and Triangular Numbers

Triangular numbers can be represented by dots arranged in rows that form equilateral triangles.

Count and write how many green triangles are in each design. These are triangular numbers.

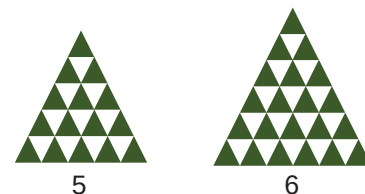
9. Triangle 1 ____ Triangle 2 ____ Triangle 3 ____
Triangle 4 ____ Triangle 5 ____ Triangle 6 ____



Count and write how many white triangles are in each design.

These are triangular numbers.

10. Triangle 1 ____ Triangle 2 ____ Triangle 3 ____
Triangle 4 ____ Triangle 5 ____ Triangle 6 ____



Count all the tiny triangles in each design.

11. Triangle 1 ____ Triangle 2 ____ Triangle 3 ____
Triangle 4 ____ Triangle 5 ____ Triangle 6 ____

The sum of two triangular numbers from the same triangle form a square.

Use the formula to calculate the measurement of each figure.



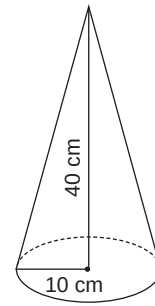
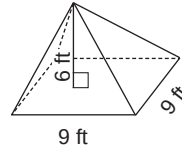
Round to the nearest tenth.

12. trapezoid $A = 96 \text{ cm}^2$ $b_1 = \underline{\hspace{1cm}}$ $b_2 = 11 \text{ cm}$ $h = 12 \text{ cm}$
p. 266

13. triangle $A = 42 \text{ in}^2$ $b = \underline{\hspace{1cm}}$ $h = 7 \text{ in}$
p. 266

14. pyramid $V = \underline{\hspace{1cm}}$
p. 228

15. cone $V \approx \underline{\hspace{1cm}}$
p. 228



Copy and simplify.

16. $-9(-3x - 7)$
p. 31

17. $-4(-3c + 2)$
p. 31

Copy and solve using the distributive property.

18. $9(89)$
p. 251

19. $3(82)$
p. 251

20. $3(815)$
p. 251

Multiply the numbers in scientific notation.



21. $(2.6 \times 10^8)(2 \times 10^6)$
p. 216

22. $(1.6 \times 10^8)(3 \times 10^{-3})$
p. 216

23. $(3 \times 10^6)(2.9 \times 10^8)$
p. 216

24. $(3.1 \times 10^{15})(3 \times 10^{-8})$
p. 216

Match each term with the correct definition.

25. policy
p. 231

a. amount policyholder pays before insurance pays for the remaining loss

26. premium
p. 231

b. agreement between a policyholder and an insurance company

27. deductible
p. 231

c. regular payment to an insurance company

Fill in the chart to count back the change. Use Worksheet 51.

28. cost of item \$8.04 amount given \$9.00
p. 260

29. cost of item \$3.46 amount given \$5.00
p. 260

Plot the ordered pairs on the coordinate plane and find the distance between the points. Round to the nearest tenth of a unit. Use Worksheet 51.



30. from $(-3, 7)$ to $(7, 5)$
p. 248

31. from $(4, 1)$ to $(-2, -5)$
p. 248