BOOK 1

Simply Good and Beautiful
MATH 6

COURSE BOOK

The Good and the Beautiful
CURRICULUM

Simply

Good and Beautiful

MATH

6

COURSE BOOK 1

Created by the Simply Good and Beautiful Math Team

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The Good and the Beautiful
CURRICULUM

Book 1 Table of Contents

ABOUT THE COURSE

Supplies Needed

- *Simply Good and Beautiful Math 6 Course Book 1* and *Simply Good and Beautiful Math 6 Course Book 2*
- *Simply Good and Beautiful Math 6 Answer Key*
- *Simply Good and Beautiful Math Scratch Pad* or other scratch paper
- Device to access videos (highly recommended)
- Pencils
- 2 standard dice
- Colored pencils
- Protractor
- Ruler
- Scissors
- Bowl
- Tape or glue
- Paper
- Tape measure

Course Overview

Math 6 consists of Books 1 and 2. There are 120 total lessons divided into four units. Each unit ends with a unit review and assessment. The course is designed to be completed by the student independently, but parents/teachers can choose to be as involved in the lessons as they would like to be.

Lesson Overview

Most lessons are four pages and consist of a warm-up, video lesson, mental math, mini lesson, practice, and review.

Warm-Up: An activity that applies to the lesson topic.

Video Lesson: Videos provide detailed teaching and interactive guided practice of the lesson topic. Scan the QR code or go to goodandbeautiful.com/Math6 to access the videos. Videos are about 12–15 minutes in length.

Mental Math Checkup: A quick review of mental math skills and facts practice.

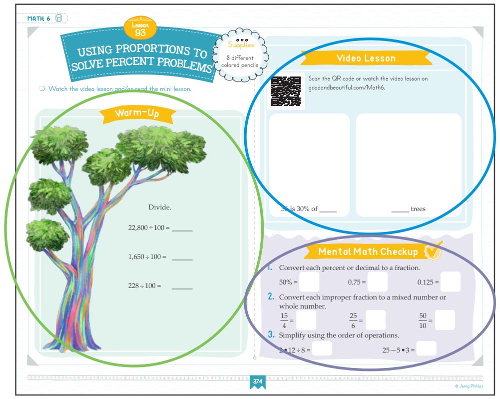
Mini Lesson: A concise written lesson on the topic.

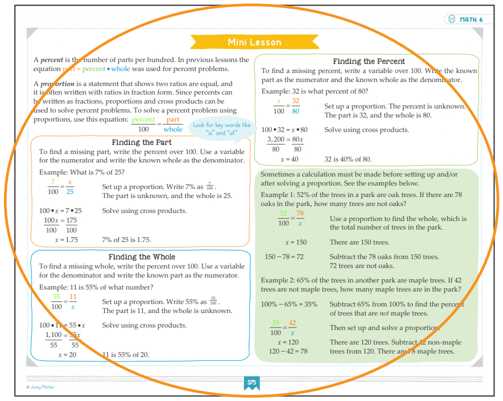
Practice: Practice that is dedicated to the lesson topic.

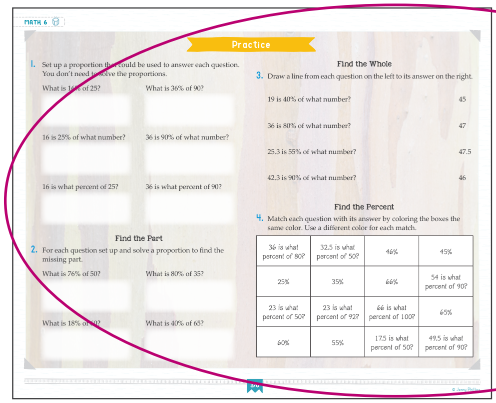
Review: Daily review of topics from previous lessons.

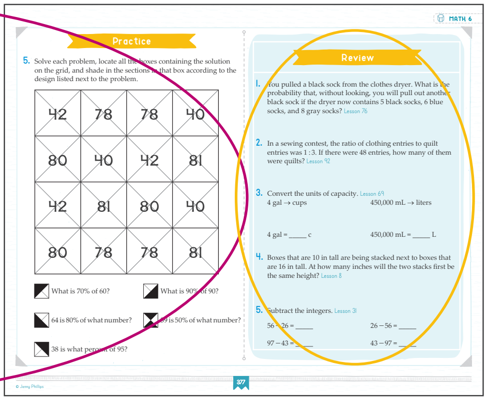
Getting Started

Simply open the first course book. Students may choose to watch the video lesson or just read the mini lesson if they feel confident in the lesson topic. Please note that videos may contain material not included in the written mini lesson. Students may complete the warm-up before or during the video. Mental math may be completed at any point during the lesson. After completing the video and/or mini lesson, the student should complete the lesson practice and review sections. Parents/teachers should check the student's work daily and provide immediate help and feedback. Students who struggle with the lesson practice should be encouraged to review the mini lesson or the video for help. Note: If printing at home, print pages at actual size.









A Reference Chart is included at the end of each course book.

Frequently Asked Questions

How many lessons should my student do each week?

- There are 120 lessons in the course. If the student completes four lessons per week, he or she will complete the course in a standard school year with typical breaks for vacation or sickness.

How long do lessons take?

- The average time to complete a lesson is 45–60 minutes. This includes time to watch the video and complete the course book sections.

What if my child is too slow/fast?

- If your child takes longer than average but is understanding and retaining information, don't worry. You may want to break up the lessons. Watch the video and begin the practice. Then finish the practice and complete the review section at another time.
- To avoid holes in his or her math foundation, we suggest not skipping entire levels if your child works more quickly than average but is learning new concepts. Consider having your child do multiple lessons a day to complete the course faster.
- If your child takes less time than average and seems to already know all the information, consider giving the Unit Assessments to see if he or she can skip any units or move on to the next course.

Do you include any specific doctrine?

- No, the goal of our curriculum is not to teach doctrines specific to any particular Christian denomination but to teach general principles such as honesty, hard work, and kindness. All Bible references in our curriculum use the King James Version.

Does my student have to watch the videos?

- The videos contain the bulk of the teaching and are highly recommended. However, if your student feels confident in the topic being taught, he or she can skip the video and read the mini lesson instead. A student who struggles with the lesson practice should be encouraged to go back and watch the video.
- Some families prefer to have the parent/teacher teach the child using the mini lesson rather than have the child watch the video lesson independently.

Is Math 6 completed independently by the child?

- Yes, Math 6 is designed for your student to complete independently, though at times students may need parent/teacher assistance to understand a concept. Parents/teachers will need to check the child's work and should do so on a daily basis when possible, providing immediate feedback.

Is Math 6 a spiral or mastery program?

- Math 6 is a spiral course, constantly reviewing concepts your student has learned to ensure understanding and retention of information.

What if there isn't room to complete the work?

- Students should always keep scratch paper on hand while completing the lessons. The *Simply Good and Beautiful Math Scratch Pad* is available for purchase.

Is a calculator used in Math 6?

- This course is designed to be completed without the use of a calculator. Lesson 117 is an introduction to calculators. A scientific calculator is helpful in this lesson but isn't necessary. Calculators should not be used for any other lessons.

UNIT 1 OVERVIEW

LESSONS 1–30

Extra Supplies Needed

- 1 standard die
- colored pencils

New Concepts Taught

- absolute value
- area of a parallelogram
- area of a trapezoid
- distance on a coordinate plane
- division with a three-digit divisor and a six-digit dividend
- expanded notation of decimal numbers through the millionths place
- expanded notation with exponents
- greatest common factor of three-digit numbers
- identity and inverse properties
- negative fractions and decimal numbers on a number line
- nets and surface area of trapezoidal prisms and parallelepipeds
- prime factorization of four-digit numbers
- prime factorization to determine least common multiples
- rational numbers with exponents

Concepts Reviewed and Expanded Upon

- addition, subtraction, multiplication, and division of decimal numbers
- addition, subtraction, multiplication, and division of fractions
- area of a triangle
- area of irregular figures
- associative, commutative, and distributive properties
- convert between fractions, decimal numbers, and percents
- convert between improper fractions and mixed numbers
- divisibility rules
- equivalent fractions
- fraction comparisons
- fractions in simplest form
- negative numbers
- number patterns and infinite sequences
- order of operations
- triangle classification

Lesson 2

PRIME FACTORIZATION

Watch the video lesson and/or read the mini lesson.

Warm-Up

The warm-up is discussed in the video.
This section can be completed either before or during the video.

Write each expression as a number in standard form.

4^2 2^5 3^3

Write each expression using exponents.

$7 \times 7 \times 7 \times 7$ 10×10

Video Lesson

Scan the QR code or watch the video lesson on goodandbeautiful.com/Math6. This section is completed during the video.

60

Mental Math Checkup

Write the answers in the spaces provided. This section is completed independently.

1. Count by 50 from 0 to 500.
2. Add 10,000 to each number.

   726,101 27,193,716 827,719
3. How many quarters are in $2.00?

Mini Lesson

A ***prime number*** is a whole number that has exactly two factors: the number itself and the number 1. Examples: 5, 13, 67

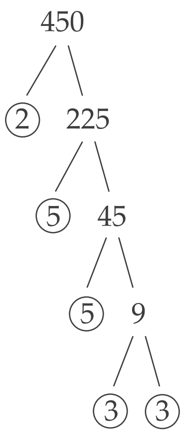
A ***composite number*** is a whole number that has more than two factors. Examples: 6, 27, 81

A ***factor pair*** is two factors of a number whose product is the given number; numbers in a factor pair are referred to as factors of the given number. Example: A factor pair of 46 is 2 and 23.

Prime factorization is a number written as the product of its prime factors. For example, the prime factorization of 60 can be written as $2 \times 2 \times 3 \times 5$ or $2^2 \times 3 \times 5$.

A ***factor tree*** is a diagram used to identify the prime factors of a composite number.

Example: Use a factor tree to find the prime factors of 450.



Start by writing the number you are factoring at the top.

Then use lines to separate the number into a factor pair.

✦ Hint: If you don't see any obvious factors, you can begin with small numbers and use the divisibility rules to find a factor. Do not use 1 as a factor because 1 is not a prime number.

See the Reference Chart for divisibility rules.

Circle factors that are prime numbers.

Separate each composite number into a factor pair until every factor is a prime number.

$450 = 2 \times 3^2 \times 5^2$

Write the prime factors (the circled numbers) as a multiplication problem in order from least to greatest, using exponents when a factor repeats.

To check your work, multiply the prime factors. The product should equal the number you started with. $2 \times 3^2 \times 5^2 = 2 \times 9 \times 25 = 450$

Practice

1. Circle the composite numbers in each set.

$\{2, 7, 12, 17, 22, 27\}$ $\{1, 3, 5, 7, 9, 11, 13\}$

$\{5, 10, 15, 20, 25, 30\}$ $\{4, 11, 19, 26, 33, 40\}$

$\{7, 16, 25, 34, 43, 52\}$ $\{0, 11, 22, 33, 44, 55\}$

2. Write all the prime numbers between 1 and 50.

______, ______, ______, ______, ______, ______, ______, ______,

______, ______, ______, ______, ______, ______, ______

3. Cross out the numbers below that are divisible by ALL of these numbers: 2, 3, 4, 5, 6, 9, and 10.

1,242 750 18,000 3,636

5,400 140,600 82,800 112,140

Practice Continued

4. Create a factor tree for each number. Then write the prime factorization of each number, using exponents when a factor repeats.

5. Using the prime factorization given below, write each number in standard form.

$2^5 \times 3 =$ _____

$3^2 \times 5 \times 7 =$ _____

$2^3 \times 11 =$ _____

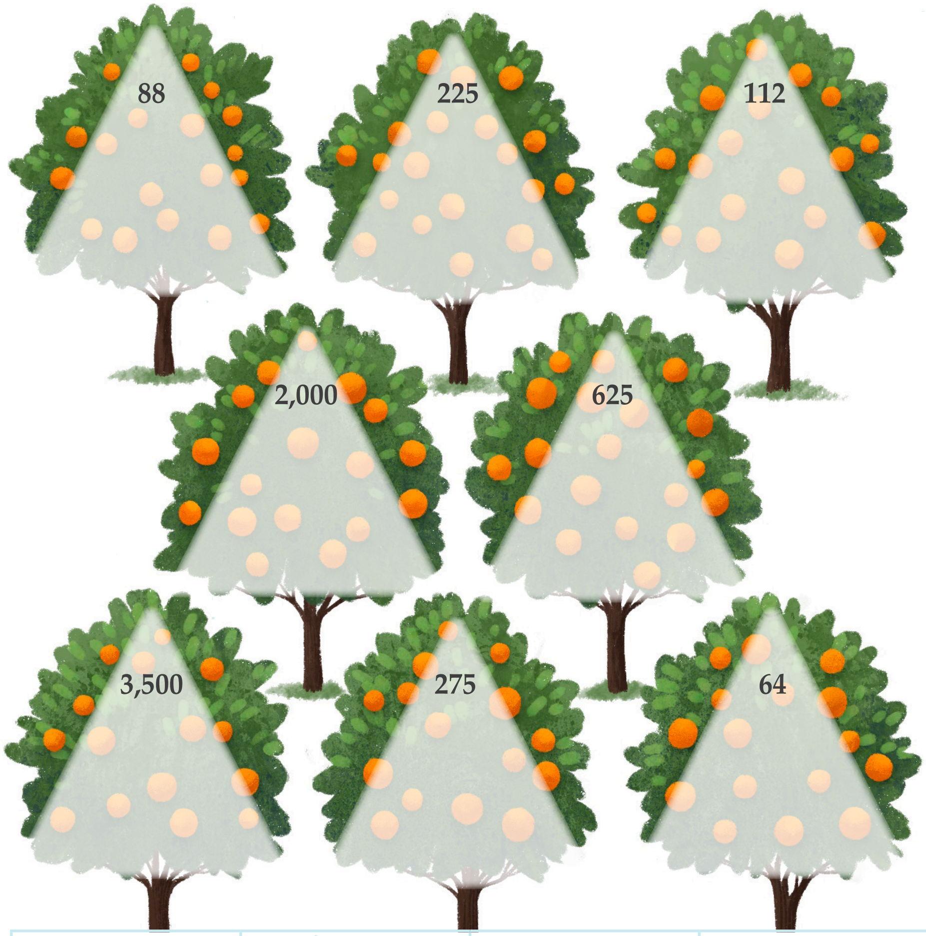
$7 \times 13^2 =$ _____

$2^2 \times 5^2 \times 17 =$ _____

$2 \times 3 \times 5 \times 7^2 =$ _____

Practice

6. Write the prime factorization of the numbers below. Then match each answer with the letter in the box to solve the riddle.



A	$3^2 \times 5^2$	**E**	5^4	**F**	$2^4 \times 5^3$	**H**	$5^2 \times 11$
L	2^6	**M**	$2^4 \times 7$	**O**	$2^3 \times 11$	**T**	$2^2 \times 5^3 \times 7$

How many oranges grow on a tree?

____ ____ ____   ____ ____   ____ ____ ____ ____!

225 64 64   88 2,000   3,500 275 625 112

Review

1. Complete each problem.

42,179 + 24,629 = ________________

6,530 ÷ 12 = ________________

6,183 × 41 = ________________

2. Find the opposite of each number. Lesson 1

Number	Opposite
–8	
5	
–3	

3. Find the absolute value of each number. Lesson 1

$|-39| =$ ☐ $|525| =$ ☐ $\left|-\frac{1}{2}\right| =$ ☐

4. Compare the following using <, >, or =. Lesson 1

$|-45|$ ○ $|-25|$ 14 ○ $|-14|$

5. List the factors of each number. Then circle the common factors.

12: ____, ____, ____, ____, ____, ____

24: ____, ____, ____, ____, ____, ____, ____, ____

Lesson 9

ADDING, SUBTRACTING, AND MULTIPLYING FRACTIONS AND MIXED NUMBERS

Watch the video lesson and/or read the mini lesson.

Warm-Up

Complete the problems.

$\frac{3}{14} + \frac{6}{14}$

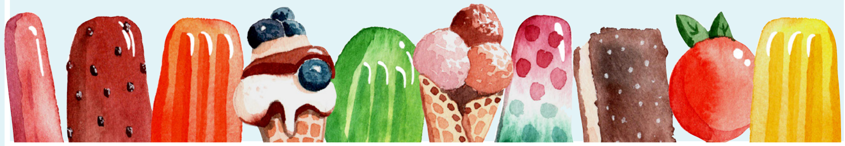
$\frac{11}{12} - \frac{1}{12}$

Video Lesson

Scan the QR code or watch the video lesson on goodandbeautiful.com/Math6.

$7\frac{3}{4} - 3\frac{1}{4}$

$\frac{2}{3} \times \frac{5}{9} \times \frac{3}{10}$



Mental Math Checkup

1. Count by 30 from 0 to 300.

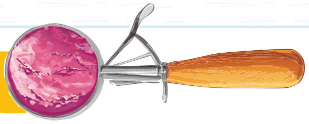
2. Multiply each number by 1,000.

712 ______ 42 ______

1,270 ______

3. How many nickels are in $2.00? ______

Mini Lesson



Adding and Subtracting Fractions

When adding or subtracting fractions with different denominators, first convert the fractions to equivalent fractions with a common denominator. Then add or subtract the numerators. The denominator stays the same.

$$\frac{3}{10} + \frac{7}{8} = \frac{12}{40} + \frac{35}{40} = \frac{47}{40} = 1\frac{7}{40}$$

Adding and Subtracting Mixed Numbers

$$8\frac{4}{9} + 11\frac{7}{9} =$$

$$19\frac{11}{9} =$$

$$19 + 1\frac{2}{9} =$$

$$20\frac{2}{9}$$

Add the whole numbers, and then add the fractions.

Write answers in simplest form.

The same principles apply to subtracting mixed numbers: subtract the whole numbers, and then subtract the fractions.

Multiplying Fractions by Fractions, Whole Numbers, and Mixed Numbers

To multiply fractions, multiply the numerators, and then multiply the denominators.

$$\frac{6}{7} \times \frac{11}{12} = \frac{66}{84} = \frac{11}{14}$$

To multiply a fraction by a whole number, first convert the whole number to a fraction by writing it with a denominator of 1. Then multiply the fractions.

$$5 \times \frac{4}{15} = \frac{5}{1} \times \frac{4}{15} = \frac{20}{15} = 1\frac{5}{15} = 1\frac{1}{3}$$

To multiply mixed numbers, first convert the mixed numbers to improper fractions. Then multiply the fractions.

$$2\frac{1}{5} \times 3\frac{1}{2} = \frac{11}{5} \times \frac{7}{2} = \frac{77}{10} = 7\frac{7}{10}$$

Subtracting a Fraction or Mixed Number from a Whole Number

To subtract a fraction or mixed number from a whole number, write the whole number as a mixed number or improper fraction by taking 1 from the whole number and writing it as a fraction equal to 1. Use the same denominator as the fraction being subtracted. Then subtract.

$$1 - \frac{8}{15} =$$

$$\frac{15}{15} - \frac{8}{15} =$$

$$\frac{7}{15}$$

$$12 - 4\frac{1}{2} =$$

$$11\frac{2}{2} - 4\frac{1}{2} =$$

$$7\frac{1}{2}$$

Canceling Before Multiplying Fractions

Canceling is a way to simplify fractions before multiplying them. To cancel, find one numerator and one denominator that are divisible by the same factor. Divide both the numerator and the denominator by that factor and write the quotients in place of the canceled numbers. Then multiply the fractions.

$$\frac{\overset{1}{\cancel{2}}}{7} \times \frac{3}{\underset{2}{\cancel{4}}} = \frac{3}{14}$$

$$\frac{\overset{1}{\cancel{5}}}{\underset{3}{\cancel{9}}} \times \frac{\overset{2}{\cancel{6}}}{\underset{5}{\cancel{25}}} = \frac{2}{15}$$

$$\frac{\overset{1}{\cancel{7}}}{\underset{5}{\cancel{10}}} \times \frac{\overset{\overset{1}{\cancel{2}}}{\cancel{4}}}{\underset{1}{\cancel{3}}} \times \frac{\overset{3}{\cancel{9}}}{\underset{\underset{1}{\cancel{2}}}{\cancel{14}}} = \frac{3}{5}$$

Cancellations may be performed in any order; just make sure to divide both a numerator and a denominator by the same number.

MATH TIP!

Canceling first makes multiplying fractions easier. If all common factors are canceled before multiplying, the answer will be in simplest form.

Complete each problem in the ice cream scene. Once you find the answer, use the matching letter to solve the riddle.

F $\frac{9}{14} + \frac{17}{28} =$

T $1\frac{6}{11} + \frac{1}{2} =$

C $8\frac{4}{6} + 5\frac{1}{9} =$

H $\frac{4}{5} + \frac{9}{10} =$

E $\frac{11}{15} - \frac{3}{5} =$

O $\frac{7}{8} + \frac{3}{5} =$

B $\frac{8}{16} + \frac{8}{32} =$

Why did the ice cream truck break down?

$\frac{3}{4}$ $\frac{2}{15}$ $13\frac{7}{9}$ $\frac{6}{11}$ $13\frac{1}{6}$ $\frac{2}{9}$ $\frac{2}{15}$ $\quad$ $1\frac{19}{40}$ $1\frac{1}{4}$

$2\frac{1}{22}$ $1\frac{7}{10}$ $\frac{2}{15}$ $\quad$ $6\frac{1}{7}$ $1\frac{19}{40}$ $13\frac{7}{9}$ $2\frac{13}{15}$ $7\frac{2}{11}$

$6\frac{1}{7}$ $1\frac{19}{40}$ $\frac{6}{11}$ $6\frac{1}{12}$

S $\frac{5}{9}-\frac{1}{3}=$

U $8\frac{1}{2}+4\frac{2}{3}=$

A $2-1\frac{5}{11}=$

R $7-\frac{6}{7}=$

Y $8-\frac{9}{11}=$

K $5-2\frac{2}{15}=$

D $13\frac{3}{4}-7\frac{2}{3}=$

Practice

1. Complete each multiplication problem.

$\frac{2}{5} \times \frac{1}{3} =$ $\frac{3}{7} \times \frac{3}{4} =$ $\frac{2}{3} \times \frac{2}{5} =$ $\frac{7}{8} \times \frac{5}{9} =$

2. Complete each problem. Cancel before multiplying.

$\frac{10}{21} \times \frac{3}{5} =$ $\frac{3}{4} \times \frac{8}{9} =$ $\frac{12}{27} \times \frac{9}{24} =$

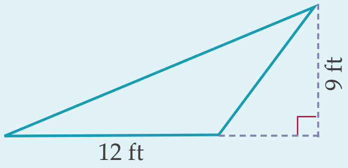
$\frac{21}{24} \times \frac{8}{14} =$ $\frac{8}{16} \times \frac{8}{32} =$ $\frac{10}{11} \times \frac{2}{15} =$

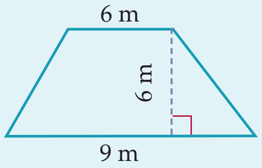
$\frac{2}{3} \times \frac{3}{5} \times \frac{1}{4} =$ $\frac{6}{11} \times \frac{5}{18} \times \frac{22}{25} =$ $\frac{4}{9} \times \frac{3}{8} \times \frac{2}{7} =$

Review

See the Reference Chart for area formulas.

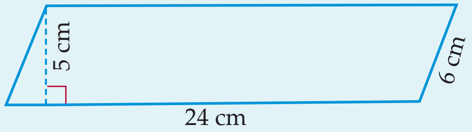
1. Find the areas of the triangle and trapezoid. Lessons 6 and 7





$A =$ ________ $A =$ ________

2. Find the perimeter and area of the parallelogram. Lesson 7



$P =$ ________ $A =$ ________

3. Find the LCM of the set of numbers by listing multiples of each number. Lesson 8

6: ______________________________

9: ______________________________

LCM of 6 and 9:____

4. Use prime factorization to find the LCM of the set of numbers. Lesson 8

Find the LCM of 21 and 15.

prime factorization of 21: ____ × ____

prime factorization of 15: ____ × ____

LCM of 21 and 15: ____ × ____ × ____ = ______

Lesson 13

MULTIPLYING DECIMAL NUMBERS

☐ Watch the video lesson and/or read the mini lesson.

Warm-Up

A family of three foxes was walking in the forest. They stumbled upon a big blueberry bush! If each fox ate 41 blueberries, how many blueberries did the fox family eat?

Video Lesson

Scan the QR code or watch the video lesson on goodandbeautiful.com/Math6.

8.35 hours = _____ hours _____ minutes

51×3.4815 ○ 51

9.25×0.467 ○ 9.25

Mental Math Checkup

1. Count by 80 from 0 to 800.
2. Divide each number by 1,000.

370,000

74,000

9,000

3. How many hours have passed from 11:00 AM to 4:00 PM?

Mini Lesson

Multiplying Decimal Numbers

Step 1

$$\begin{array}{r} 502.13 \\ \times\ \ 4.21 \\ \hline \end{array}$$

Line up the factors on the right.

Factors are numbers that are multiplied together to form a product.

Step 2

$$\begin{array}{r} {\scriptstyle 1} \\ 502.13 \\ \times\ \ 4.21 \\ \hline 50213 \\ 1004260 \\ +\ 20085200 \\ \hline 21139673 \end{array}$$

Multiply the factors, ignoring the decimal points.

Multiplication is often easier to perform when the top factor is the number with more digits.

Step 3

$$\begin{array}{r} {\scriptstyle 1} \\ 502.13 \\ \times\ \ 4.21 \\ \hline 50213 \\ 1004260 \\ +\ 20085200 \\ \hline 21139673 \end{array}$$

Count the total number of decimal places (the digits to the right of the decimal point) in both factors.

Step 4

$$\begin{array}{r} {\scriptstyle 1} \\ 502.13 \\ \times\ \ 4.21 \\ \hline 50213 \\ 1004260 \\ +\ 20085200 \\ \hline 2113.9673 \end{array}$$

Count the same number of decimal places in the product, starting on the right, and write a decimal point.

Additional Example

Zeros are written in front of the product when there are more decimal places in the factors than digits in the product.

$$\begin{array}{r} {\scriptstyle 1\ 1\ \ \ 1} \\ 0.13404 \\ \times\ \ 0.312 \\ \hline 26808 \\ 134040 \\ +\ 4021200 \\ \hline 0.04182048 \end{array}$$

The total number of decimal places is 8: 5 in the top factor and 3 in the bottom factor.

Round to Estimate a Product

Round factors to the nearest whole number (or to a number close in value that is easy to work with) to quickly estimate a product.

Example: 79.834 × 4.209

Estimated product: $80 \times 4 = 320$

Actual product: 336.021306

MATH TIP!

Multiplying a number by a decimal number **less than one** will result in a smaller number.

$36 \times 0.245 < 36$
$8.82 < 36$

$190 \times 0.01 < 190$
$1.9 < 190$

$8.954 \times 0.798 < 8.954$
$7.145292 < 8.954$

Multiplying a number by a decimal number **greater than one** will result in a larger number.

$45 \times 3.627 > 45$
$163.215 > 45$

$562 \times 10.4 > 562$
$5{,}844.8 > 562$

$18.493 \times 116.5 > 18.493$
$2{,}154.4345 > 18.493$

Practice

1. Multiply.

4 × 5 =

4 × 0.5 =

0.4 × 0.5 =

7 × 8 =

7 × 0.008 =

0.07 × 8 =

6 × 6 =

6 × 0.06 =

0.06 × 0.006 =

15 × 2 =

1.5 × 0.2 =

15 × 0.002 =

0–25 seedlings
$1.60 each

26–50 seedlings
$1.45 each

51–75 seedlings
$1.30 each

76–100+ seedlings
$1.15 each

4. A family business sells tree seedlings at a discounted rate per seedling when they are purchased in bulk (large amounts). Use the chart to find the cost of each purchase. The first one is done for you.

35 seedlings: $50.75

18 seedlings: ______

72 seedlings: ______

109 seedlings: ______

2. Match each problem with its estimated product by rounding each factor to the nearest whole number.

4.35 × 11.953

6.8042 × 0.742

121.3564 × 2.5

5.6312 × 199.701

39.7 × 70.35872

2,800

363

48

1,200

7

3. Estimate each product by rounding the factors to the nearest whole number and multiplying. Then find the actual product.

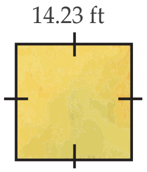
15.02 × 0.931 estimated product: ______

actual product: ______

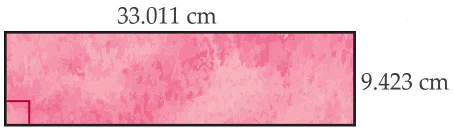
2.314 × 12.52 estimated product: ______

actual product: ______

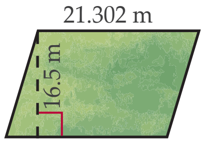
5. Find the area of each quadrilateral.



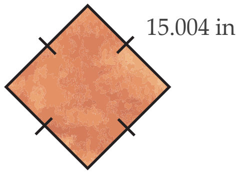
A = ______



A = ______



A = ______



A = ______

6. Complete these problems using mental math. Write < or > in each circle. Need help? Look at the end of the mini lesson.

284 × 0.035 ○ 284

65 × 8.42 ○ 65

4.9 × 1.002 ○ 4.9

8,720 × 0.621 ○ 8,720

0.523 × 7.18 ○ 0.523

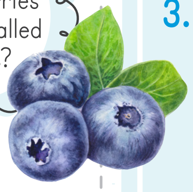
124.92 × 0.99 ○ 124.92

Practice Continued

7. Complete the story problem.

Blueberries are a favorite treat for many foxes! Blueberries are one of the few naturally blue fruits, and they are a very nutritious snack! One cup of blueberries has 3.6 grams of fiber. How many grams of fiber are in 9.5 cups of blueberries?

Can you guess why blueberries were once called star berries?



8. Find and circle the only fox that has a product of 34.524.

✦ Hint: Use estimation and what you've learned about decimal places.

4.9 × 9.02

2.2 × 15.4

7.703 × 4.14

5.895 × 6.43

16.44 × 2.1

Review

1. Write <, >, or = between each set of fractions. Lesson 4

$\frac{18}{43}$ ○ $\frac{18}{35}$ $\frac{15}{30}$ ○ $\frac{35}{70}$ $\frac{15}{24}$ ○ $\frac{15}{25}$

2. Cancel first, and then multiply the fractions. Lesson 9

$\frac{9}{15} \times \frac{6}{5} \times \frac{5}{9} =$ $\frac{3}{5} \times \frac{1}{4} \times \frac{5}{6} \times \frac{8}{11} =$

3. Find each term. Lesson 10

What is the third term if the first term is 4 and the rule is $+\frac{1}{3}$? ____

What is the tenth term if the first term is $\frac{1}{2}$ and the rule is ×2? ____

What is the fourth term if the first term is –25 and the rule is +10? ____

4. Write the number below in standard form. Lesson 11

sixty and nine thousand eighteen millionths

____

5. Round 89.79648 to the place values below. Lesson 12

thousandths ____
ten thousandths ____
hundredths ____

Lesson 15

MUSEUM LOGIC

There is no video or review for this lesson.

Instructions

Welcome to the museum! Today you are taking a guided tour through the museum with your homeschool group. As your tour guide explains each exhibit, you are in awe of how much history there is to learn. Midway through the tour, your guide allows for a quick break to use the restroom and look around. You and a couple of friends head to the Egypt exhibit. You love exploring the hieroglyphics, and you lose track of the time. You and your friends finally find your way back to where the tour guide was, but she and your group are nowhere to be found. Pull out and cut apart the puzzle cards on the following pages. Then solve the puzzles to gather clues that will help you and your friends find the location of your group.

Map of the Museum

Riddle

Your tour group is in the

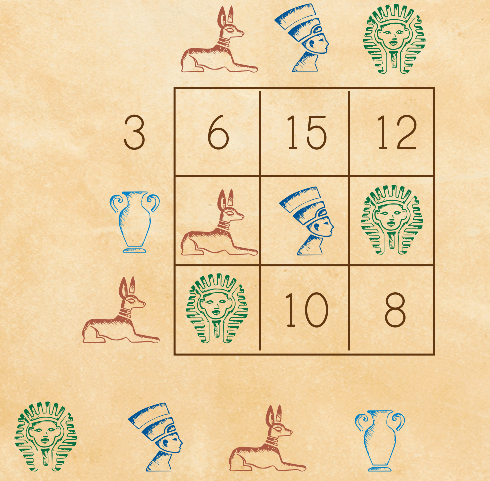
___ ___ ___   ___ ___ ___ ___ E ___ ___.

6 8 12   4 6 1 1   8 5


55
7
5
4
8
9
10
5
14
× × = 12
2
8

PUZZLE 1

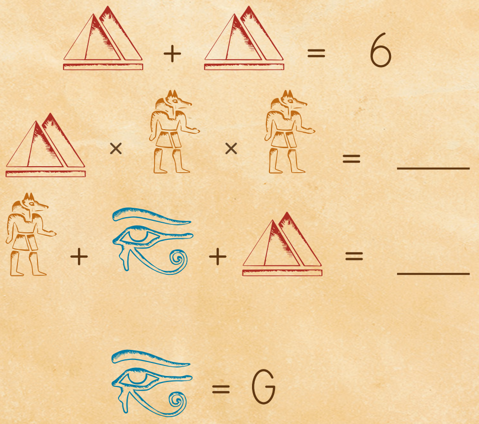
Find the value of each image in this multiplication table. The sum of the values for each symbol is the clue for the riddle.



____ + ____ + ____ + ____ = T

PUZZLE 2

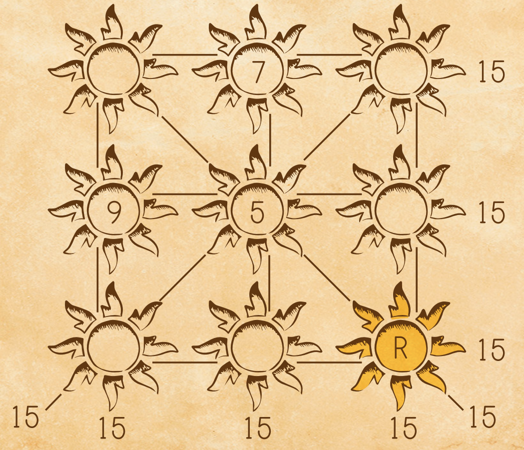
Some of the answers to the problems listed are lost in the museum. Search the museum for the missing answers and fill them in. Then solve for the unknown symbols. The value of the unknown symbol is the clue for the riddle.



PUZZLE 3

Place each of the digits below in one of the suns. The three numbers connected by lines need to add up to 15. The number found in the yellow sun is the clue for the riddle. Three numbers are already placed for you.

1 2 3 4 ~~5~~ 6 ~~7~~ 8 ~~9~~



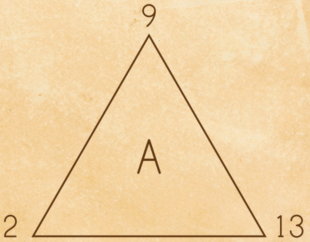
See the example problem and solution on the back of this card.

Pull this page out and cut apart the puzzle cards.

PUZZLE 4

In the museum, find the two pyramids with numbers and copy them on this card. Start at the bottom right vertex. As you travel around to each vertex, figure out which operations must be performed with the numbers to equal the number in the middle. Then use the same operations and travel in the same direction to find the answer to this puzzle. See the example on the back of this card. The value for the letter in the triangle is the clue for the riddle.

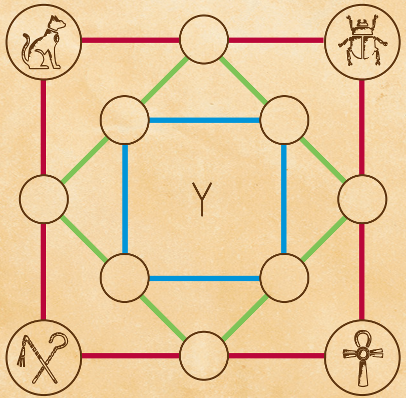
Copy pyramids here.



See the example problem and solution on the back of this card.

PUZZLE 5

Find the values for each of the symbols in the illustration. For each side of the red and green squares, write the difference between the corners in the circle on that side. The numbers at the corners of the blue square should be the same. That number is the value for the letter found in the center of the blue square and is the clue for the riddle.



HINT: Subtract the smaller number from the larger number.

See the example problem and solution on the back of this card.

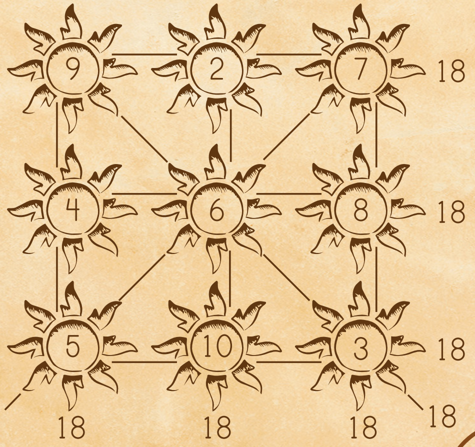
PUZZLE 6

Find the symbols in the illustration. Then complete each division problem. The number found in the yellow square is the clue for the riddle.

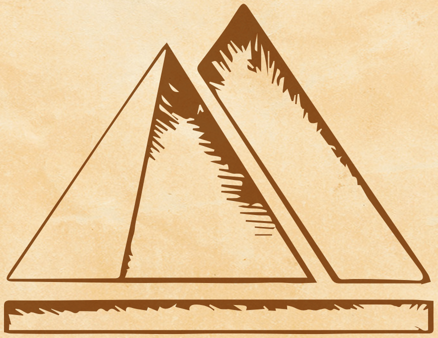
24	÷		=	
÷	■	÷	■	÷
	÷		=	
=	■	=	■	=
	÷		=	L

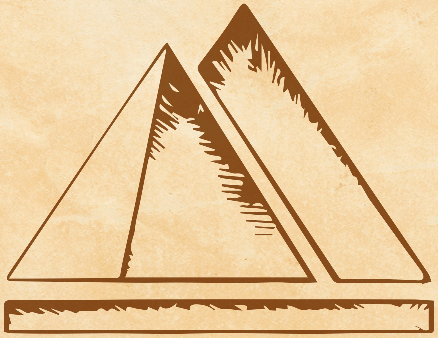
This example uses the numbers in the box to make sums of 18. All numbers in a horizontal, vertical, and diagonal line add up to 18.

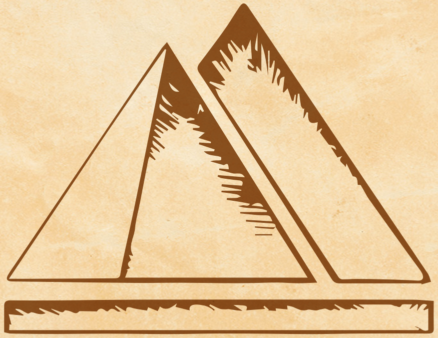
2 3 4 5 6 7 8 9 10



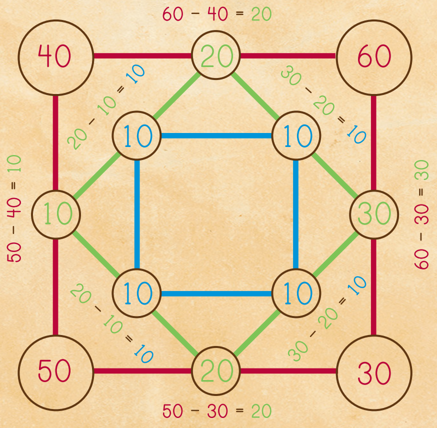
PUZZLE 3 EXAMPLE





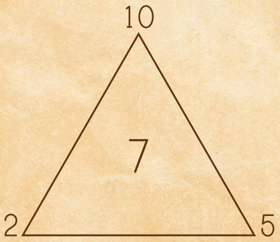


The difference between numbers at the corners of the red square equals the number in each corner of the green square. The difference between the numbers in the corners of the green square equals the number in each corner of the blue square. The numbers in the corners of the blue square are the same.



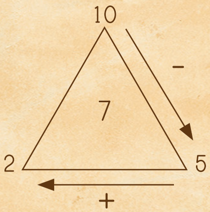
PUZZLE 5 EXAMPLE

Note: For this problem, start at the top vertex.

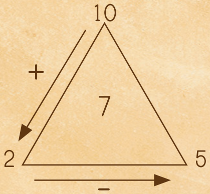


Possible Solutions

10 - 5 + 2 = 7



10 + 2 - 5 = 7



PUZZLE 4 EXAMPLE


60
+ + = 9
6
35
40

Lesson 22

SURFACE AREA AND NETS

☐ Watch the video lesson and/or read the mini lesson.

Warm-Up

Write the area formula for each shape.

rectangle: ____________________

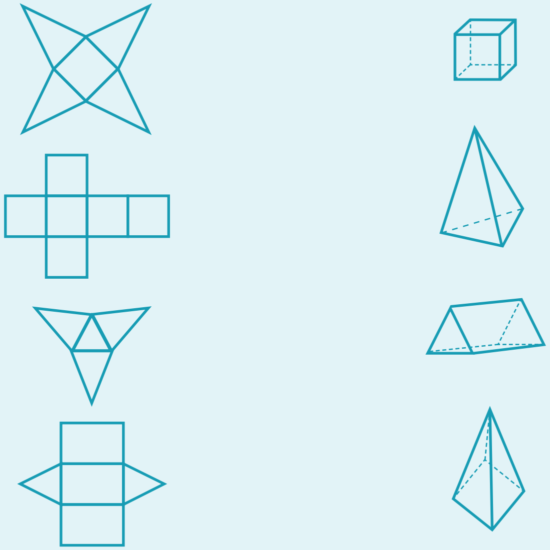
parallelogram: ____________________

triangle: ____________________

trapezoid: ____________________

Video Lesson

Scan the QR code or watch the video lesson on goodandbeautiful.com/Math6.



Mental Math Checkup

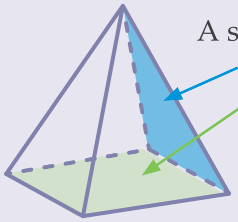
1. Count by 250 from 0 to 2,500.
2. Multiply each number by 700.

5 ______ 10 ______ 12 ______

3. If today is Tuesday, what day will it be 10 days from now? ______

Mini Lesson

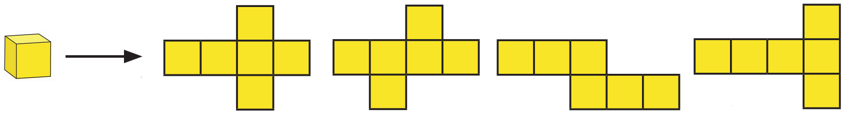
Area is the number of square units needed to cover a flat surface. A ***face*** is a flat surface on a solid. ***Surface area*** is the total area of the surface of an object.



A square pyramid has 5 faces. 4 triangles and 1 square make up the surface.

A ***net*** is a two-dimensional pattern of the surface of a three-dimensional figure. A net may be used to determine the surface area of an object. There are several ways to draw a net for a given figure.

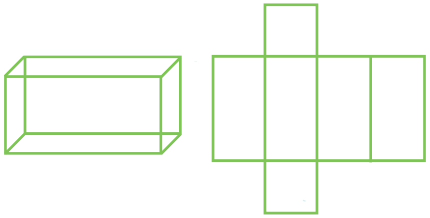
Four Examples of Nets for a Cube



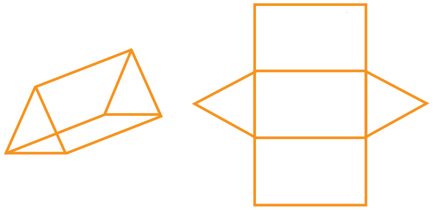
A ***prism*** is a solid with two congruent, parallel bases.

Examples of Prisms and Their Nets

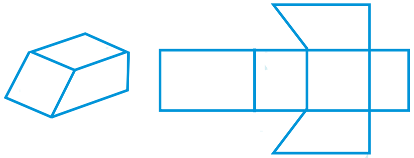
Rectangular Prism



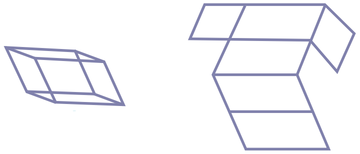
Triangular Prism



Trapezoidal Prism

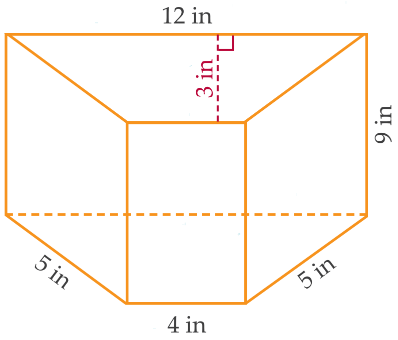


Parallelogram Prism
(Parallelepiped)



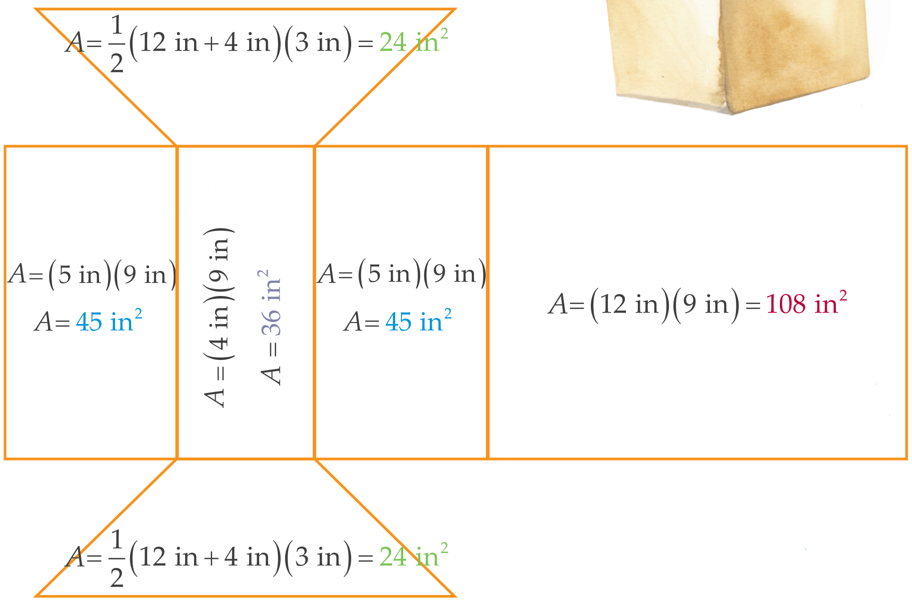
To find the surface area of a solid, find the area of each face and add the areas.

See Reference Chart for area formulas.



Example:

- Find the area of each face. A net is helpful to visualize the individual faces.
- Add the areas together to find the surface area.



$$\text{surface area}=24\text{ in}^2+45\text{ in}^2+36\text{ in}^2+45\text{ in}^2+108\text{ in}^2+24\text{ in}^2=282\text{ in}^2$$

Here is another way to write the surface area:

$$\text{surface area}=2(24\text{ in}^2)+2(45\text{ in}^2)+36\text{ in}^2+108\text{ in}^2=282\text{ in}^2$$

TOY FACTORY Shipping

RC car 236 in²

doll 180 in²

football 295 in²

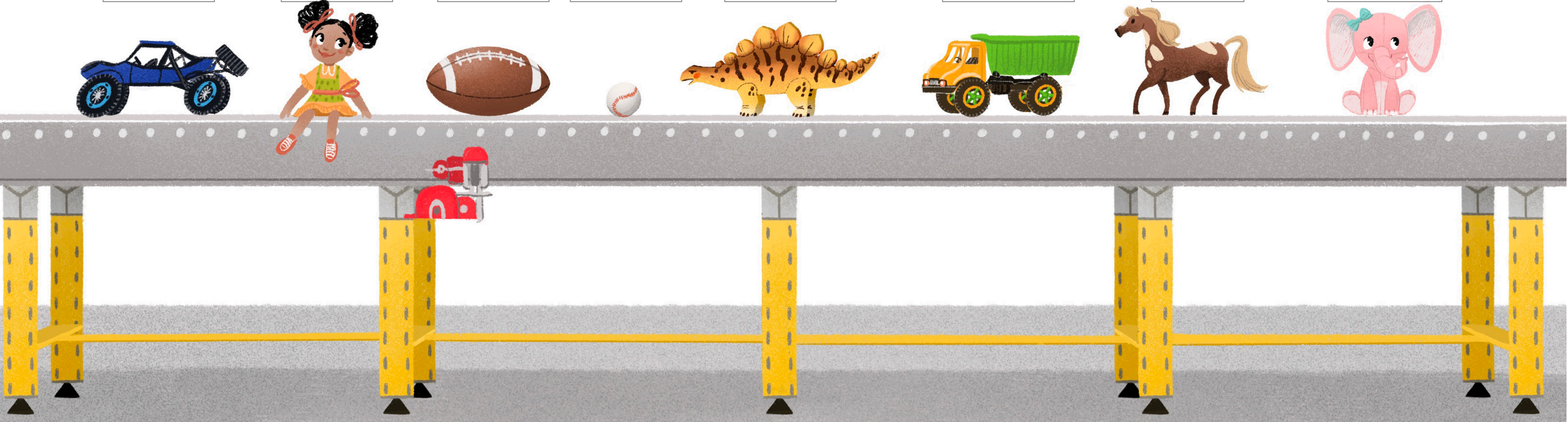
baseball 96 in²

dinosaur 170 in²

dump truck 282 in²

horse 212 in²

elephant 161 in²



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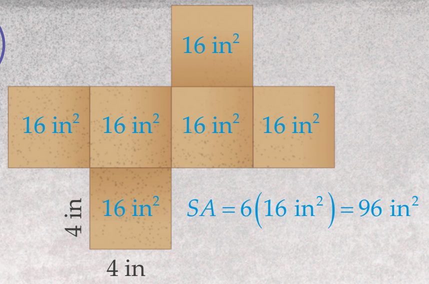

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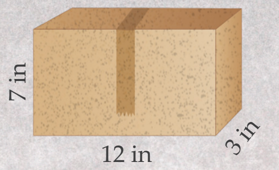

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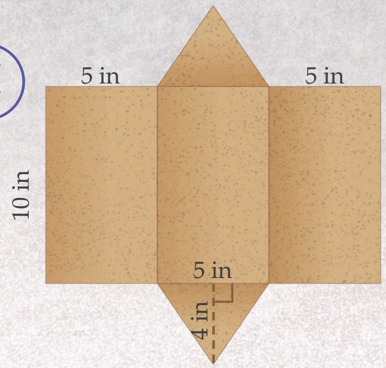

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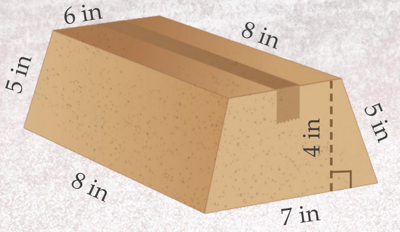


Practice

Each toy in the toy factory has a specific box it fits into. Find the surface area of the boxes in the illustration to find which box is for which toy. Write the name of the toy in the chart to match the box with the same surface area. Once you find the correct box for each toy, write the name of the prism in the table. Box A is given as an example.

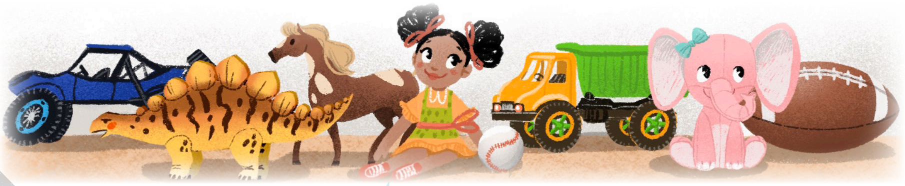
Box Letter	Toy Name	Type of Prism
A	baseball	cube
B		
C		
D		

Word Bank

rectangular prism
triangular prism
~~cube~~
trapezoidal prism

Four of the toys are missing boxes. List the four toys on the lines provided.

__________ __________ __________ __________



Review

1. Use prime factorization to find the LCM of 10 and 14. Lesson 8

prime factorization of 10: ____________________

prime factorization of 14: ____________________

LCM of 10 and 14: ________

2. Compare the numbers using <, >, or =. Lesson 11

7.1793 ○ 7.1893

0.0841 ○ 0.0814

3. Evaluate each expression. Lesson 19

$\left(\frac{3}{4}\right)^2$

$10^2 + 5^3$

$\frac{4^3}{8}$

4. Evaluate each expression. Lesson 20

$15 + 5^2 - 4^2 + 108 \div 9$

$200 - 11 \bullet 12 + 6^2 \div 4 + (14 - 9)$

Practice

1. Convert each fraction or mixed number to a decimal. Write repeating decimals with a bar.

Hint: Divide the numerator by the denominator.

$\frac{3}{8}$ = ________

$3\frac{2}{5}$ = ________

$\frac{5}{6}$ = ________

$16\frac{2}{9}$ = ________

$204\frac{3}{5}$ = ________

$8\frac{7}{16}$ = ________

2. Convert each fraction to a decimal. Then write all the decimal numbers in order from least to greatest.

$\frac{17}{20}, \frac{7}{8}, \frac{4}{5}, \frac{89}{100}, \frac{33}{40}$

________, ________, ________, ________, ________

3. Convert each decimal to a percent.

0.62 = ________

5.04 = ________

7.319 = ________

9 = ________

86.1 = ________

0.0324 = ________

4. Convert each fraction or mixed number to a percent.

$\frac{23}{100}$ = ________

$\frac{17}{50}$ = ________

$\frac{9}{20}$ = ________

$\frac{5}{8}$ = ________

$\frac{3}{10}$ = ________

$\frac{16}{25}$ = ________

$1\frac{4}{5}$ = ________

$4\frac{1}{10}$ = ________

$3\frac{3}{8}$ = ________

One of Vincent van Gogh's paintings is scrambled. Convert each number on the back of the painting puzzle pieces according to the instructions. Then cut out the puzzle pieces and place each piece on top of the matching answer on the grid found on page 103. Once you have completed the puzzle, you can glue each piece to the grid.

The name of this painting is *Irises*, and it was painted in France in 1889.

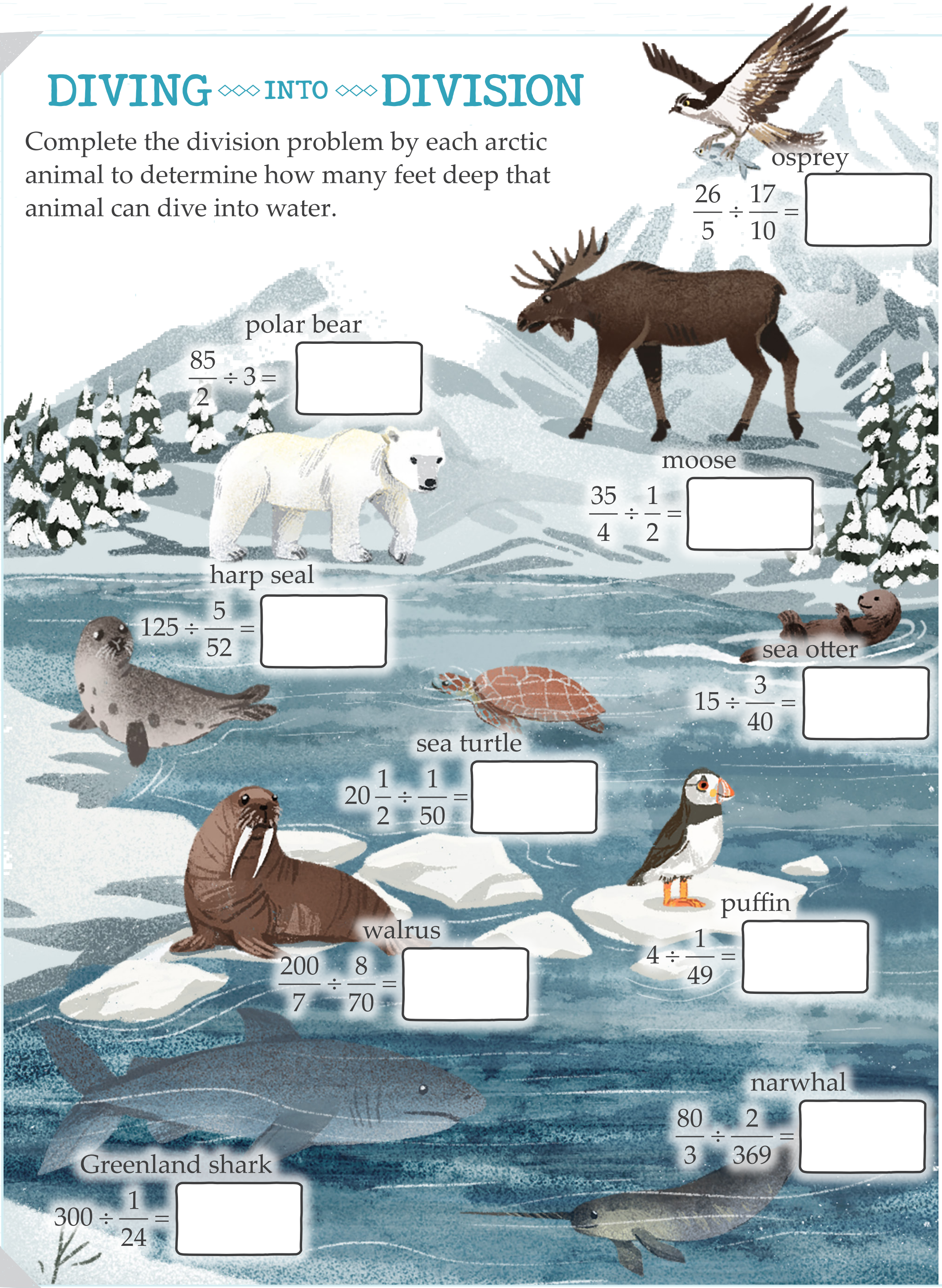
All done! No review.

Convert $\frac{37}{100}$ to a decimal. ________	Convert $\frac{37}{100}$ to a percent. ________	Convert 0.54 to a fraction. ________	Convert 0.54 to a percent. ________
Convert 28% to a fraction. ________	Convert 28% to a decimal. ________	Convert 2.05 to a fraction. ________	Convert 2.05 to a percent. ________
Convert $\frac{19}{5}$ to a decimal. ________	Convert $\frac{19}{5}$ to a percent. ________	Convert 0.425 to a fraction. ________	Convert 0.425 to a percent. ________
Convert 189% to a decimal. ________	Convert 189% to a fraction. ________	Convert 0.9 to a fraction. ________	Convert 0.9 to a percent. ________

90%	$2\frac{1}{20}$	0.37	0.28
3.8	42.5%	54%	$1\frac{89}{100}$
1.89	$\frac{27}{50}$	380%	$\frac{7}{25}$
$\frac{17}{40}$	205%	$\frac{9}{10}$	37%

DIVING INTO DIVISION

Complete the division problem by each arctic animal to determine how many feet deep that animal can dive into water.



osprey $\frac{26}{5} \div \frac{17}{10} =$

polar bear $\frac{85}{2} \div 3 =$

moose $\frac{35}{4} \div \frac{1}{2} =$

harp seal $125 \div \frac{5}{52} =$

sea otter $15 \div \frac{3}{40} =$

sea turtle $20\frac{1}{2} \div \frac{1}{50} =$

walrus $\frac{200}{7} \div \frac{8}{70} =$

puffin $4 \div \frac{1}{49} =$

narwhal $\frac{80}{3} \div \frac{2}{369} =$

Greenland shark $300 \div \frac{1}{24} =$

Review

1. Multiply. Lesson 9

$2\frac{1}{4} \times 4\frac{3}{5} =$ $1\frac{4}{7} \times 3\frac{1}{3} =$

2. Add or subtract. Lesson 12

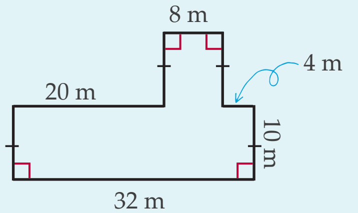
$185.57 + $9.13 + $25.98 =

$9,435 – $5,714.34 =

3. Compare the following using <, >, or =. Lesson 20

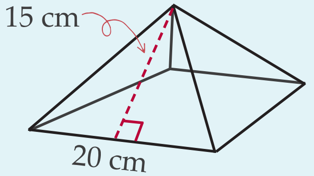
$12 \bullet 6 \div 3^2 - (3.5 - 2.5) + 5 \bigcirc \frac{2}{5} \bullet 35 - (4^2 - 6) + (21 \div 7)$

4. Find the area of the irregular figure. Lesson 21



$A =$ ____________

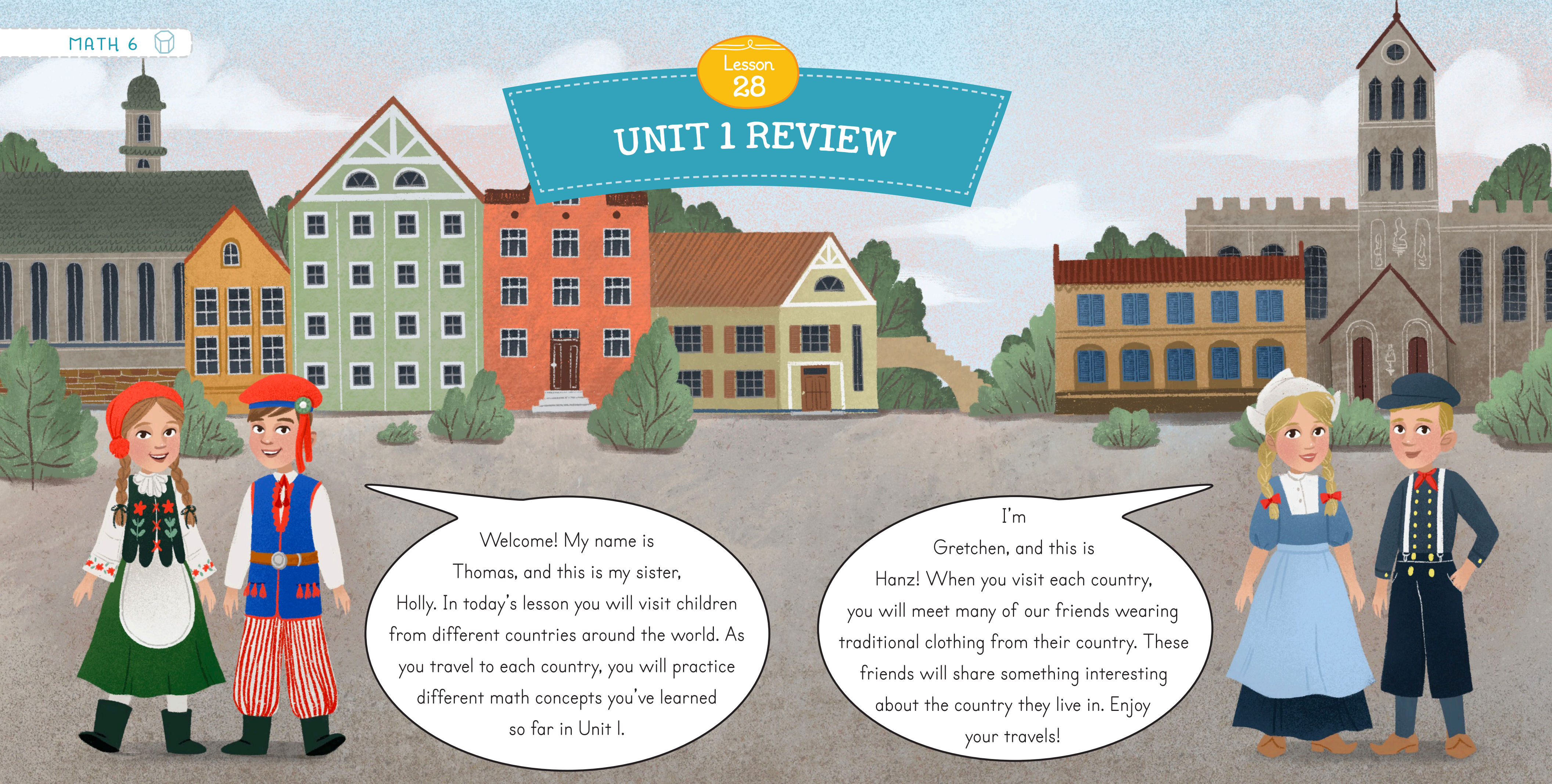
5. Find the surface area of the square pyramid. Lesson 22



$SA =$ ____________

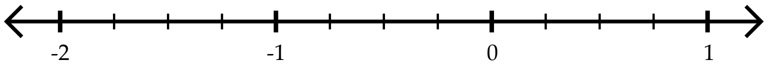
Lesson
28

UNIT 1 REVIEW

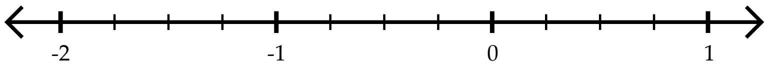


Fractions, Decimals & Number Lines Lessons 4 & 14

1. Use fractions and mixed numbers to fill in the missing values on the number line.



2. Plot these points on the number line. Point A: –1.25 Point B: 0.75 Point C: –0.5



3. Write the fractions in order from least to greatest in simplest form.

$\frac{9}{13}, \frac{5}{11}, \frac{7}{14}$ ______________________

Number Patterns & Properties Lessons 10 & 26

1. Determine the rule for each sequence. Then circle A if the sequence is arithmetic or G if it is geometric.

$-24, -12, -6, -3, -1\frac{1}{2}, \ldots$ rule: ___________ A or G

$11.3, 9, 6.7, 4.4, 2.1, \ldots$ rule: ___________ A or G

2. Match each example to the property it demonstrates.

$7(40-3) = 7 \bullet 40 - 7 \bullet 3$

$23 + 15 = 15 + 23$

$58 \bullet 1 = 58$

$46 + (-46) = 0$

$(5 \bullet 4)10 = 5(4 \bullet 10)$

Identity

Inverse

Associative

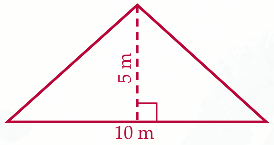
Commutative

Distributive

Nigeria is known for its monoliths, which are large blocks of stone. Zuma Rock is a natural monolith located outside the capital city.

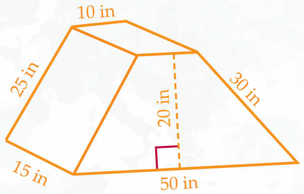
Area, Perimeter & Surface Area Lessons 6, 7 & 22

1. Find the area and/or perimeter of each shape.



$A =$ _________ $P =$ _________ $A =$ _________

2. Find the surface area of the trapezoidal prism below.



$SA =$ ______________

The northern region of Poland is an important breeding ground for white storks. White storks build very large nests, sometimes over 2 m (6.6 ft) across and weighing up to 250 kg (551.2 lb).

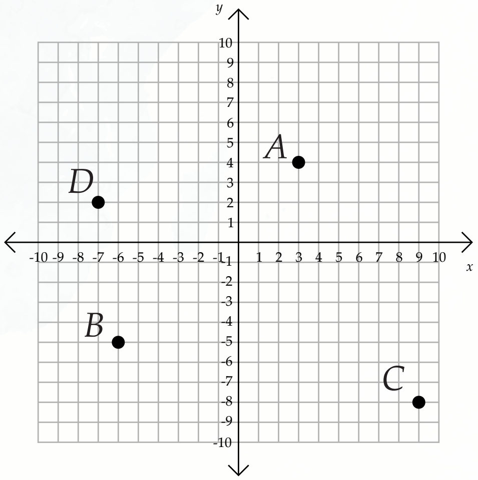
Coordinate Planes Lesson 27

Write the coordinates and quadrant for each point.

Point *A*: _________ Point *B*: _________ Point *C*: _________ Point *D*: _________

quadrant _____ quadrant _____ quadrant _____ quadrant _____

Spain is home to one of the most endangered cats: the Iberian lynx. There is a natural reserve for lynx in southern Spain.



LESSONS 29–30

UNIT ASSESSMENT

Instructions

- Unit assessments give you practice with the math concepts learned in this unit without having you overpractice concepts that you have mastered. These assessments also give you practice working on math problems for an extended period of time. This helps you to extend focus and attention span and to be better prepared for any type of testing you will have to do in the future. Here are some tips: First, always read the instructions carefully. Sometimes you can get answers wrong simply because you did not understand the instructions. Second, do not rush through exercises you think you already know. Instead, do your work carefully. Sometimes you can get answers wrong, even though you understand the concept, just because you rushed. Finally, if you feel you are having trouble focusing, take a quick break to do something else, like ten jumping jacks, and then come back. There are no videos, mini lessons, or practice problems for Lessons 29–30.
- **For Lesson 29,** complete all the exercises with purple headers only. You may cover the additional practice sections or fold the page to concentrate only on the purple sections. Have your parent or teacher correct the work. If there are mistakes in a section, your parent or teacher will check the orange “Additional Practice” checkbox for that section.
- **For Lesson 30,** complete all the orange sections that are checked. If you still make multiple mistakes, review those sections. All the principles will be reviewed again in upcoming units. If you have only a few or no orange sections to practice, you may move on to the next lesson.
- Parents/teachers may determine if the student may use the Reference Chart for the assessment. It is recommended that the student first try the assessment without the Reference Chart and then refer to it if needed.

Student

OPPOSITES & ABSOLUTE VALUE

(LESSON 1)

Find the opposite of each number.

3 ____ $-\frac{4}{5}$ ____ 6.2 ____

Find the absolute value of each number.

$|-8| =$ ____ $|7.7| =$ ____ $|-14| =$ ____

Compare the following using <, >, or =.

$|-26|$ ○ $|26|$ $|-32|$ ○ $|-36|$

☐ Additional Practice

OPPOSITES & ABSOLUTE VALUE

The numbers 5 and –5 are opposites.

Absolute values are never negative. $|-2| = 2$

Complete the chart.

Number	Opposite	Absolute Value
9		
$-\frac{3}{4}$		
−18.02		
$7\frac{1}{6}$		

DECIMAL ADDITION, SUBTRACTION, MULTIPLICATION & DIVISION & ROUNDING (LESSONS 12, 13, 16 & 17)

Round 2.835649 to the place values below.

ten thousandths: __________________

hundredths: __________________ ones: ______

Add or subtract.

$\$15.61 + \$802.48 =$

$25.7 + 0.09 + 16.132 =$

$94.35 - 26.0814 =$

Multiply or divide.

$4.5 \bullet 10.02 =$

$2.03 \bullet 0.6103 =$

$826.28 \div 9.08 =$

EXPANDED NOTATION WITH EXPONENTS (LESSONS 11 & 18)

Write 7.908 in expanded notation using . . .

fractions ____

decimals ____

Write $(3\times10^{5})+(5\times10^{3})+(2\times10^{2})+(9\times10^{1})+(8\times10^{0})$ in standard form.

____

Additional Practice

DECIMAL ADDITION, SUBTRACTION, MULTIPLICATION & DIVISION & ROUNDING

If the digit to the right of the place value you are rounding to is less than 5, round down. If it is 5 or greater, round up.

Round 6.254893 to the place values below.

thousandths: __________________ tenths: _________

Line up the decimal points to add or subtract the numbers.

$\$90.42 + \$1,365.39 =$ $73.4 - 2.0738 =$

Multiply the numbers. Count the number of decimal places in both factors to know where to write a decimal point in the answer.

$9.1 \bullet 6.005 =$ $3.02 \bullet 0.501 =$

Move the decimal point in the divisor to make a whole number and move the decimal point in the dividend the same number of places to the right. Divide as usual.

$28.4 \div 0.32 =$ $217.875 \div 4.15 =$

Additional Practice

EXPANDED NOTATION WITH EXPONENTS

Below are examples of expanded notation for 45.062 with . . .

fractions: $(4\times10)+(5\times1)+\left(6\times\frac{1}{100}\right)+\left(2\times\frac{1}{1,000}\right)$

decimals: $(4\times10)+(5\times1)+(6\times0.01)+(2\times0.001)$

Here is 8,749 in expanded notation with exponents:
$(8\times10^{3})+(7\times10^{2})+(4\times10^{1})+(9\times10^{0})$

Write 53.0604 in expanded notation using . . .

fractions ____

decimals ____

Write $(7\times10^{4})+(2\times10^{3})+(6\times10^{1})+(4\times10^{0})$ in standard form.

____

UNIT 2 OVERVIEW

LESSONS 31–60

Extra Supplies Needed

- colored pencils
- protractor
- ruler

New Concepts Taught

- addition and subtraction of integers
- adjacent angles
- area and perimeter of a semicircle
- central angles
- coefficients, constants, terms, and variables in expressions
- complementary and supplementary angles
- complex fractions
- convert between turns and degrees
- cube roots
- decimal percentages
- distance between two points on a coordinate plane
- equations with decimals and fractions
- evaluate expressions with exponents, fractions, and negative numbers
- evaluate expressions with more than one variable
- factor an expression
- find the percent when the whole and a part are known
- find the whole when the percent and a part are known
- identify and combine like terms
- missing angle measures in triangles and quadrilaterals
- multiple transformations on a coordinate plane
- multiplication and division of integers
- names of quadrants on a coordinate plane
- one-step equations with addition and subtraction
- one-step equations with multiplication and division
- parts of a circle: central angles and chords
- percent problems with fractions
- sum of the interior angle measures of a quadrilateral
- sum of the interior angle measures of a triangle

Concepts Reviewed and Expanded Upon

- angle classification
- area and circumference of a circle
- check solutions
- differences between an equation and an expression
- distributive property
- graph in all four quadrants
- measure and construct angles using a protractor
- name geometric figures with symbols and letters
- percent of a number
- pi
- polygons and other geometric figures
- quadrilateral classification
- radius and diameter
- reflectional, translational, and rotational symmetry
- square roots
- transformations on a coordinate plane
- volume of a cube

Lesson 33

SQUARE AND CUBE ROOTS

☐ Watch the video lesson and/or read the mini lesson.

Warm-Up

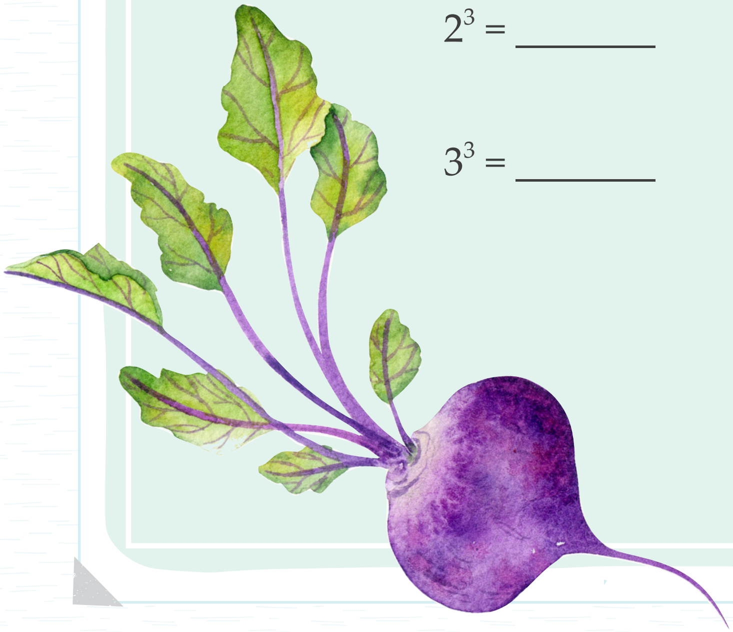
Evaluate the following.

4^2 = ________

8^2 = ________

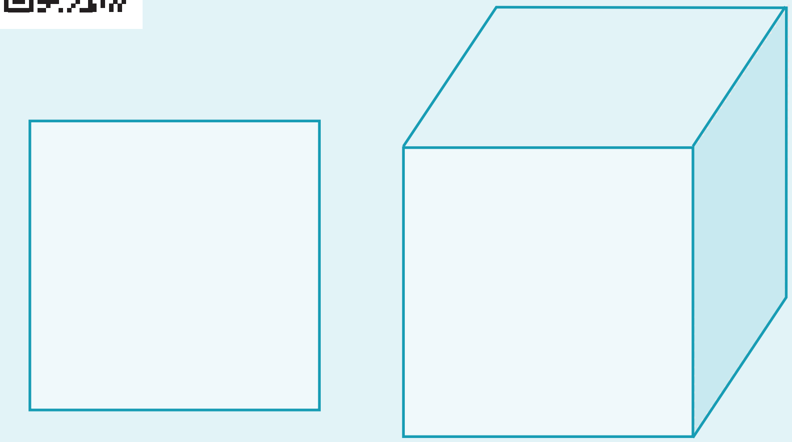
2^3 = ________

3^3 = ________



Video Lesson

Scan the QR code or watch the video lesson on goodandbeautiful.com/Math6.



Mental Math Checkup

1. Evaluate the following.

6^2 = ☐ 5^2 = ☐

2. What is $\frac{1}{4}$ of 16? ☐

3. Start at 25. Perform each operation in the following order:
−7, ÷6, ×5, +6, ÷3 ☐

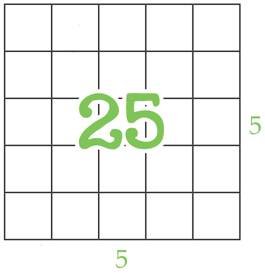
Mini Lesson

A *perfect square* is the product of an integer multiplied by itself. A *square root* is a factor of a number that, when multiplied by itself, equals the original number.

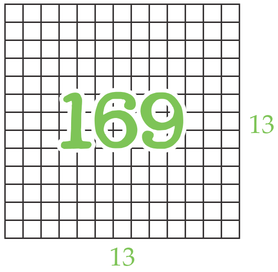
For positive numbers, squaring a number and finding the square root of that number are inverse operations—they undo each other.

Examples:

$5^2 = 25$ and $\sqrt{25} = 5$



$13^2 = 169$ and $\sqrt{169} = 13$



To find a square root, ask yourself, "What number multiplied by itself equals the number under the square root symbol?"

Example:

$\sqrt{144}$

$\underline{\ ?\ } \bullet \underline{\ ?\ } = (\underline{\ ?\ })^2 = 144$

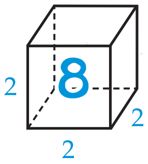
$12 \bullet 12 = 12^2 = 144$

$\sqrt{144} = 12$

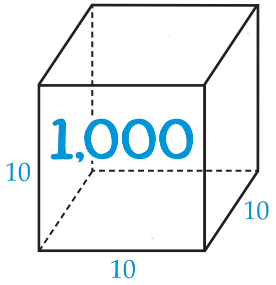
A *perfect cube* is the product of an integer multiplied three times. Finding the cube root of a number is the inverse operation of cubing a number. A cube (third) root symbol is written like this: $\sqrt[3]{\ }$.

Examples:

$2^3 = 8$ and $\sqrt[3]{8} = 2$



$10^3 = 1{,}000$ and $\sqrt[3]{1{,}000} = 10$



To find a cube root, ask yourself, "What number multiplied three times equals the number under the cube root symbol?"

Example:

$\sqrt[3]{125}$

$\underline{\ ?\ } \bullet \underline{\ ?\ } \bullet \underline{\ ?\ } = (\underline{\ ?\ })^3 = 125$

$5 \bullet 5 \bullet 5 = 5^3 = 125$

$\sqrt[3]{125} = 5$

Practice

1. Find each square root.

$\sqrt{16} =$ $\sqrt{121} =$ $\sqrt{64} =$ $\sqrt{81} =$

$\sqrt{169} =$ $\sqrt{144} =$ $\sqrt{196} =$ $\sqrt{225} =$

2. Find each cube root.

$\sqrt[3]{27} =$ $\sqrt[3]{1,000} =$ $\sqrt[3]{64} =$ $\sqrt[3]{1} =$

$\sqrt[3]{125} =$ $\sqrt[3]{8} =$ $\sqrt[3]{216} =$ $\sqrt[3]{343} =$

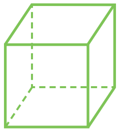
3. Match the square roots and cube roots that have the same values.

$\sqrt{1}$ $\sqrt{25}$ $\sqrt{100}$ $\sqrt{81}$ $\sqrt{64}$

$\sqrt[3]{125}$ $\sqrt[3]{1,000}$ $\sqrt[3]{729}$ $\sqrt[3]{1}$ $\sqrt[3]{512}$

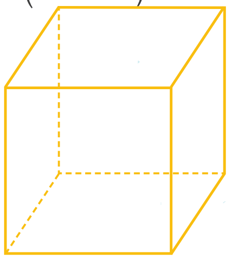
> For he shall be as a tree planted by the waters, and that spreadeth out her roots by the river, and shall not see when heat cometh, but her leaf shall be green; and shall not be careful in the year of drought, neither shall cease from yielding fruit.
>
> Jeremiah 17:8

4. Find the volume and surface area of each cube. The volume of a cube is the side length cubed ($V = s^3$), and the surface area is the area of one face times six ($SA = 6s^2$).



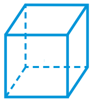
$V =$ ____________

$SA =$ ____________



$V =$ ____________

$SA =$ ____________



$V =$ ____________

$SA =$ ____________

5. What number has a square root of . . .

12? ______ 15? ______ 13? ______

What number has a cube root of . . .

4? ______ 3? ______ 5? ______

6. Complete each problem.

$\sqrt{121} + \sqrt[3]{64} =$

$\dfrac{\sqrt{36}}{\sqrt[3]{27}} =$

$\sqrt[3]{125} - \sqrt{49} =$

$\sqrt[3]{1,000} \bullet \sqrt{196} =$

7. Compare the expressions using <, >, or =.

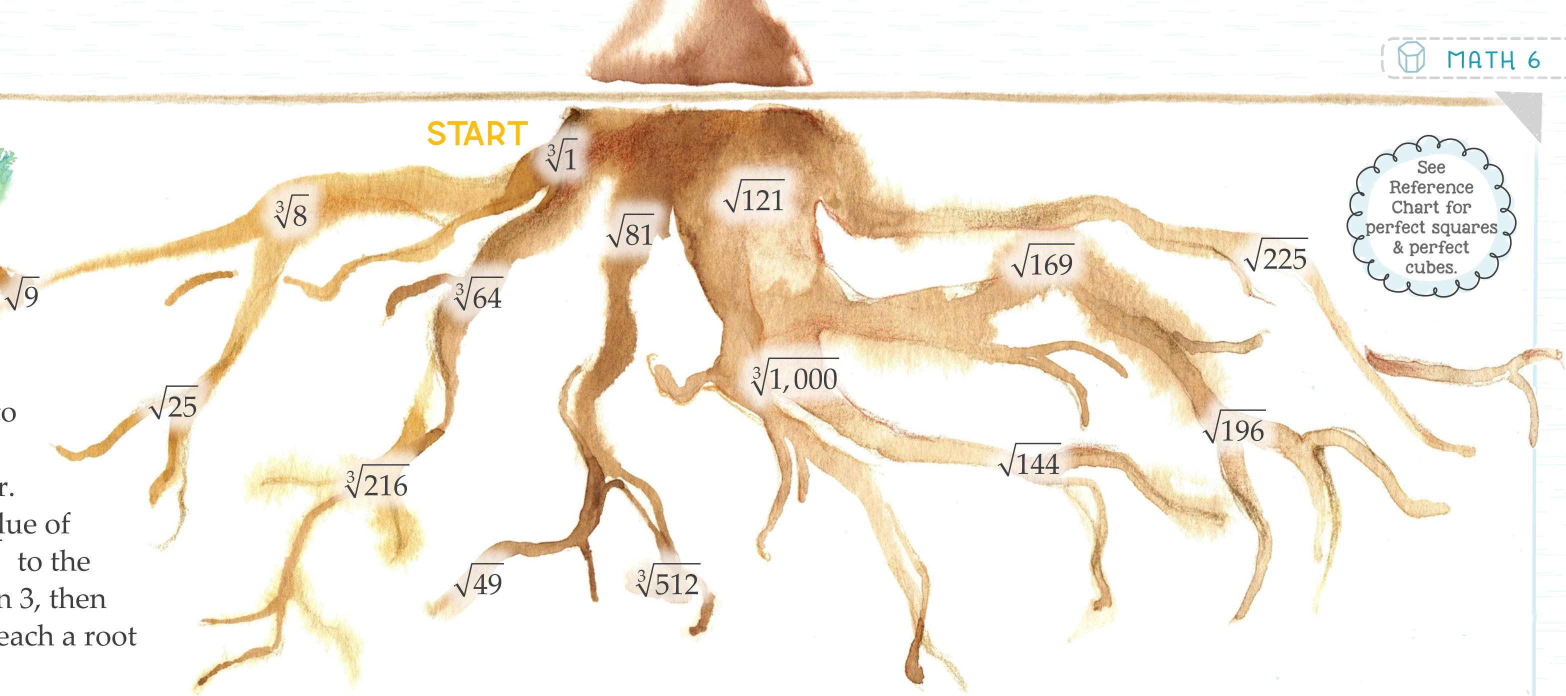
$\sqrt[3]{216}$ ○ $\sqrt{36}$

$\dfrac{\sqrt{225}}{3}$ ○ $\sqrt[3]{216}$

$\sqrt{64} + \sqrt[3]{8}$ ○ $\sqrt{100}$

Practice

Start at $\sqrt[3]{1}$. Draw a path to a root with a value that is one whole number greater. For example, $\sqrt[3]{1}$ has a value of 1, so draw a path from $\sqrt[3]{1}$ to the root with a value of 2, then 3, then 4, and so forth until you reach a root with a value of 15.



See Reference Chart for perfect squares & perfect cubes.

Review

1. Divide. Lesson 25

$8 \div \frac{4}{3} =$ $\frac{1}{2} \div \frac{5}{8} =$ $1\frac{3}{5} \div \frac{7}{10} =$

2. Determine the property shown by each statement. Then write the first letter(s) of that property on the line. Lesson 26

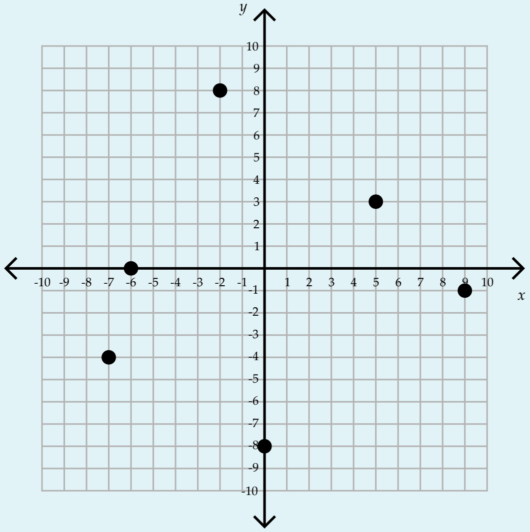
Associative property | Commutative property | Distributive property
IDentity property | INverse property

$65 \bullet 1 = 65$ ____
$-9 + 9 = 0$ ____
$2(9+3) = 2 \bullet 9 + 2 \bullet 3$ ____

3. Complete each problem. Lessons 31 & 32

$15-(-10)=$ $-2+19=$ $-3(-4)=$ $-35 \div 5=$

4. Write the coordinates of the point that is at each location. Lesson 27



Quadrant I: ______
Quadrant II: ______
Quadrant III: ______
Quadrant IV: ______
x-axis: ______
y-axis: ______

Lesson 34

EXPRESSIONS

Watch the video lesson and/or read the mini lesson.

Warm-Up

Complete the problems.

$3 \bullet 4 - 12$ ______

$5 \bullet 9 - 2 + 7$ ______

$32 \div 4 + 9 \bullet 2$ ______

Video Lesson

Scan the QR code or watch the video lesson on goodandbeautiful.com/Math6.

Number of terms: ______	Number of terms: ______
Terms: ______	Terms: ______
Variables: ______	Variables: ______
Coefficients: ______	Coefficients: ______
Constants: ______	Constants: ______

Mental Math Checkup

1. Evaluate the following.

   $4^2 - 5^2 =$

2. Fill in the missing operations that make the statement true.

   15 ☐ 5 = 2 ☐ 1

3. Start at 2. Perform each operation in the following order:

   ×12, −4, ÷5, +12, −5

Mini Lesson

An ***expression*** is a number, variable, or combination of numbers and/or variables joined by operations. It is a math phrase that can be simplified, but not solved. There is no equal sign, and different values for the variable(s) could be substituted into the expression.

Examples of expressions: $4 + 3$ x $2y$ $5a - 9 + b$

A ***term*** is one part of an expression, which may be a number, a variable, or a product of numbers and variables. Terms are separated by plus or minus signs.

$$\underbrace{2x} + 3$$

terms

A ***variable*** is a symbol, often a letter, that represents an unknown value.

$$2\underset{\substack{\uparrow \\ \text{variable}}}{x} + 3$$

A ***coefficient*** is a number that is multiplied by a variable or product of variables. All variables have a coefficient. If a variable has no number written with it, the coefficient is 1.

$$\underset{\substack{\uparrow \\ \text{coefficient}}}{2}x + 3$$

A ***constant*** is a term with no variable. A constant is a term that is just a number.

$$2x + \underset{\substack{\uparrow \\ \text{constant}}}{3}$$

Variables in Expressions

A variable represents an unknown value in an expression.

Example: Mia read n nonfiction books and f fiction books. Write an expression for the total number of books she read.

- The variable n represents the unknown number of nonfiction books.
- The variable f represents the unknown number of fiction books.
- Add the variables to find the total number of books: $n + f$

To write an expression, look for words that show the operation(s) and use variables for unknown values. The chart below shows examples of phrases and expressions.

the sum of a number and 3 a number plus 3 add 3 to a number a number increased by 3 a number and 3 more the total of a number and 3	$n + 3$	the difference between a number and 4 a number minus 4 subtract 4 from a number 4 less than a number a number decreased by 4 4 fewer than a number	$n - 4$
the product of 5 and a number 5 times a number 5 multiplied by a number	$5n$ or $5 \bullet n$	the quotient of a number and 6 a number divided by 6	$\frac{n}{6}$ or $n \div 6$

Practice

1. For each expression, follow the instructions below.

- ☐ Underline the coefficients.
- ☐ Circle the variables.
- ☐ Cross out the constants.

$3x + 8$

12

$a + 3 + 8c$

$4t - 7 + 9d$

$\frac{1}{5}m + n$

$11k - 4 + p$

2. Write the coefficient of each term.

Term	Coefficient
$10p$	
$-5m$	
v	
$-t$	

3. Write the number of terms in each expression.

Expression	Number of Terms
$3x - y$	
$-2 - 5a + 3b - c + 7$	
$2 - m + n + p^2$	
x	

4. Circle the operation(s) found in each expression.

Expression	Operations
$3x$	addition, subtraction, multiplication, division
$6x - 5$	addition, subtraction, multiplication, division
$3(x + 2)$	addition, subtraction, multiplication, division
$8 - \frac{x}{2}$	addition, subtraction, multiplication, division

5. Use the information to write an expression. Use n for the variable.

the product of twenty-four and a number ______________

the sum of twelve and a number ______________

the difference between a number and thirty-five ______________

two more than the quotient of ten and a number ______________

twice a number plus three ______________

the sum of three times a number and forty-four ______________

6. Write T if the statement is true and F if the statement is false.

The coefficient in the expression $15x$ is 15. _____

The constant in $7p + 9 - 3s$ is -3. _____

The coefficients in the expression $g - 5 + 6r$ are 5 and 6. _____

The variables in the expression $ab + c$ are a, b, and c. _____

The coefficient in the expression $-qr$ is -1. _____

There are 5 terms in the expression $2d + 4 - h - k$. _____

Practice

7. Write an expression for each scenario using the variable given.

Domenic had 32 marbles. Then he received *m* marbles on his birthday. How many marbles does he have now?

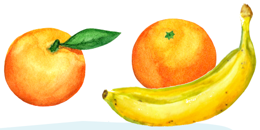
Belinda wants to give 3 mini muffins to each of the *v* volunteers at the park. What is the total number of muffins she will give to the volunteers?

Grayson's dad is *d* years old. Grayson is half the age of his dad. How old is Grayson?

Zara has *r* red ribbons and 12 fewer yellow ribbons. How many yellow ribbons does she have?

Bryant has *c* model cars and *a* model airplanes. How many model cars and airplanes does he have in all?

There are *b* bananas in a bag and *t* tangerines in a box. Marta bought 3 bags of bananas and 2 boxes of tangerines. How many pieces of fruit did she buy?



Review

1. Complete each division problem. Lessons 16 & 17

$56{,}315 \div 5 =$

$932 \div 3.2 =$

$0.054 \div 0.6 =$

2. Find the sum or difference. Lesson 31

$-25 - 9 =$

$81 - (-12) =$

$-32 + 15 =$

3. Find the product or quotient. Lesson 32

$-5(-12) =$

$95 \div (-5) =$

$-130 \div (-10) =$

4. Find each root. Lesson 33

$\sqrt[3]{8} =$

$\sqrt{144} =$

$\sqrt[3]{125} =$

Lesson 35

EVALUATING EXPRESSIONS

☐ Watch the video lesson and/or read the mini lesson.

Warm-Up

Evaluate the following.

$(-2)^2$ ______

$9 - (-5)$ ______

$4(-8)$ ______

$-12 + (-7)$ ______

Video Lesson

Scan the QR code or watch the video lesson on goodandbeautiful.com/Math6.

$$30 - m$$

Mental Math Checkup

Complete each division fact in your head, and then write the answer in the box.

$72 \div 8 =$ ☐

$42 \div 6 =$ ☐

$63 \div 9 =$ ☐

$24 \div 4 =$ ☐

$60 \div 5 =$ ☐

$121 \div 11 =$ ☐

$56 \div 7 =$ ☐

$35 \div 5 =$ ☐

$96 \div 12 =$ ☐

$108 \div 9 =$ ☐

$72 \div 9 =$ ☐

$48 \div 4 =$ ☐

Mini Lesson

To evaluate an expression means to substitute a given value in place of a variable and perform the operation(s). Remember to use the order of operations and math properties when evaluating expressions.

Expressions can be evaluated for different values of the variable.

Example: Evaluate $4x+1$ when . . .

$x=3$	$x=\frac{3}{4}$	$x=-2.5$
$4(3)+1$	$4\left(\frac{3}{4}\right)+1$	$4(-2.5)+1$
$12+1$	$3+1$	$-10+1$
13	4	-9

Evaluating Expressions with Multiple Variables

Evaluate the expression $a+b^2-3c+10$ when $a=5$, $b=-2$, and $c=\frac{1}{3}$.

$$a+b^2-3c+10$$

Substitute the values for the variables. Write negative numbers and fractions in parentheses.

$$5+(-2)^2-3\left(\frac{1}{3}\right)+10$$

Evaluate exponents. $(-2)^2=(-2)(-2)=4$

$$\downarrow$$

$$5+4-3\left(\frac{1}{3}\right)+10$$

Multiply. $3\left(\frac{1}{3}\right)=\left(\frac{\overset{1}{\cancel{3}}}{1}\right)\left(\frac{1}{\underset{1}{\cancel{3}}}\right)=1$

$$\downarrow$$

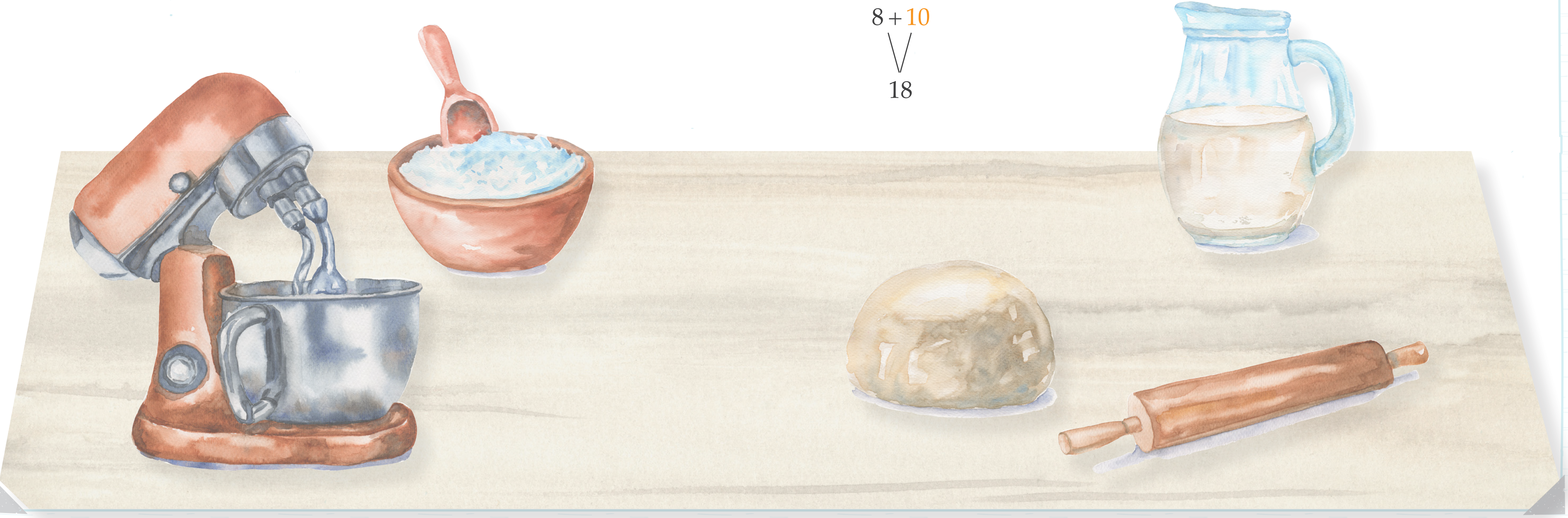
$$5+4-1+10$$

Add and subtract, working from left to right.

$$9-1+10$$

$$8+10$$

$$18$$



Practice

1. Evaluate each expression when $n = 10$.

$38 + n$ ______

$-n + (-7)$ ______

$1.2n$ ______

$2n - 12$ ______

$\frac{n}{40}$ ______

$\frac{n}{5} + (-3)$ ______

2. Evaluate each expression with the values given. The first one is given as an example.

$20 - x$

$x = 5$ 15

$x = -4$ ______

$x = 3.5$ ______

$9y$

$y = 6$ ______

$y = \frac{1}{3}$ ______

$y = -3$ ______

3. Write an expression with the information given. Then evaluate the expression using the value of the variable. The first one is given as an example.

the sum of a and 22 $a + 22$ $a = -10$ 12

the difference between b and 3 ______ $b = 10$ ______

the quotient of c and 8 ______ $c = 56$ ______

the product of 40 and d ______ $d = \frac{1}{8}$ ______

4. On the first line, substitute the values in place of the variables. On the second line, evaluate the expression. The first one is given as an example.

$r + s^2 - 2$ $r = 6,\ s = 4$ $6 + 4^2 - 2$ 20

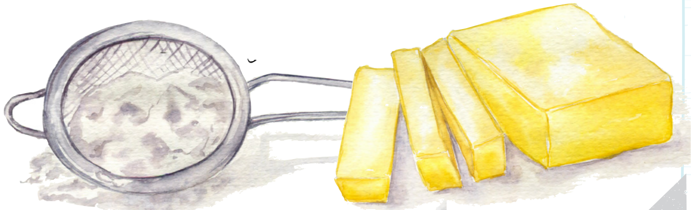
$4n - 2m + 1 - p$ $m = 4,\ n = 7,\ p = 2$ ______ ______

$\frac{x}{3} + 0.05 + y$ $x = 9,\ y = 5.25$ ______ ______

5. There are p peaches in a box and n nectarines in a bag. Ellie bought 2 boxes of peaches, 5 bags of nectarines, and 3 oranges. Write an expression to show how many pieces of fruit Ellie bought.

______

Evaluate the expression if $p = 10$ and $n = 8$. ______



Practice

6. Dragonflies are expert fliers that can fly forward, straight up and down, backward, or in a zigzag pattern. Follow the steps below to find out how fast a dragonfly can fly!

- ☐ Evaluate each expression using the following values:

  $a = -2,\ b = \frac{1}{3},\ c = 4.5,\ d = 10$

- ☐ After evaluating an expression, cross off the answer in the box.
- ☐ The product of the two leftover numbers is how fast (in miles per hour) a dragonfly can fly!

$6bd + b^0$ ______

$\frac{2c}{3} + 5$ ______

$2 + d + \frac{a}{-2}$ ______

$b^2 + d - \frac{1}{9}$ ______

$12.5 - c + a$ ______

$d - 2^3 + a$ ______

$c^2 - d - 1.25$ ______

$3a + c + 3 + 3c$ ______

$\frac{d - 25}{3}$ ______

$9b + d - 2 + 3b$ ______

15	7	6	9	0	13
8	10	−5	12	5	21

A dragonfly can fly ______ miles per hour!

Review

1. Complete the division problem. Lessons 16 & 17

$9.125 \div 0.05 =$

2. Find the product or quotient. Lesson 32

$-3(-15) =$

$-64 \div (-8) =$

3. Find each root. Lesson 33

$\sqrt{169} =$

$\sqrt[3]{64} =$

$\sqrt[3]{27} =$

4. Write the coefficient of each term. Lesson 34

Term	Coefficient
$-5k$	
$1.7m$	
z	
$-w$	

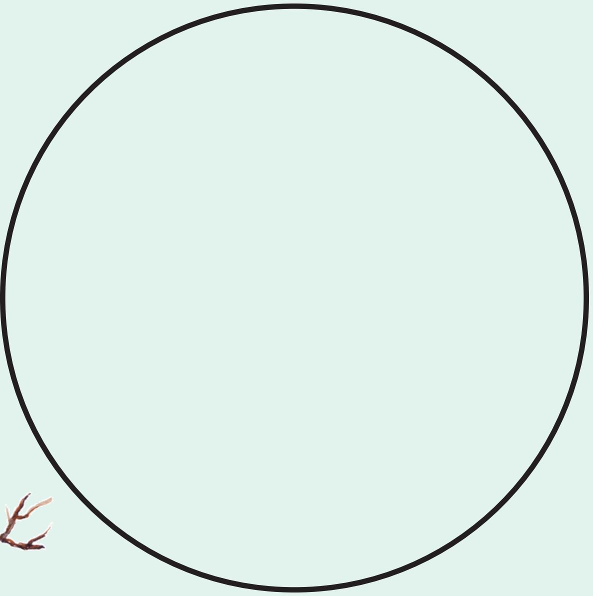
Lesson 42

AREA AND CIRCUMFERENCE OF CIRCLES AND SEMICIRCLES

☐ Watch the video lesson and/or read the mini lesson.

Warm-Up

Draw a diameter and a radius on the circle below.



Video Lesson

Scan the QR code or watch the video lesson on goodandbeautiful.com/Math6.

Mental Math Checkup

1. Evaluate the following.

   $2^3 =$ ☐ $3^3 =$ ☐

2. What is $\frac{2}{3}$ of 12? ☐

3. Start at 12. Perform each operation in the following order:

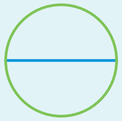
   ×3, ÷6, +5, +10, ÷7 ☐

Mini Lesson

PI

Pi (π) is the ratio of the circumference of a circle (the distance around the circle) to its diameter (the distance across a circle through the center).

$$\pi = \frac{\text{circumference}}{\text{diameter}}$$



For any circle, the circumference divided by the diameter is the number pi. Pi has an infinite number of digits. Here is pi with the first 30 decimal place values:

3.141592653589793238462643383279...

An approximate decimal value of pi is 3.14. As a fraction, pi is approximately $\frac{22}{7}$. Substitute 3.14 for π in this course unless the directions say to use $\frac{22}{7}$.

CIRCUMFERENCE OF A CIRCLE

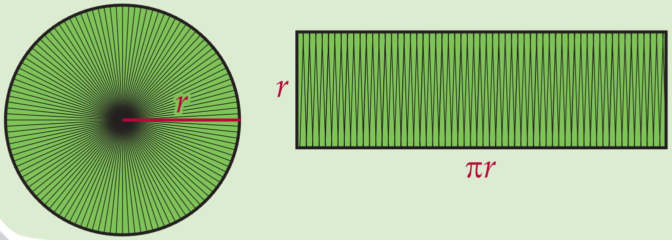
The definition of pi, $\pi = \frac{C}{d}$, could be rewritten as $C = \pi d$, which is the formula used to find the circumference of a circle. Because the diameter is twice the length of the radius, the formula could also be written like this: $C = 2\pi r$.

AREA OF A CIRCLE

If a circle is cut into many tiny sectors and those sectors are placed side by side, they form a rectangle with a height of r and a base of πr. To find the area of the rectangle, multiply the base by the height.

$A = \pi r \bullet r = \pi r^2$

The area of the rectangle is πr^2, so the area of a circle is also πr^2. $A = \pi r^2$



(The circumference of the circle is $2\pi r$, so the length of the base of the rectangle is half of $2\pi r$, which is πr.)

CIRCLE FORMULAS

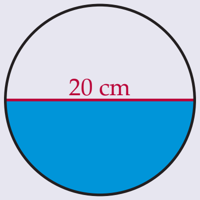
AREA	CIRCUMFERENCE
$A = \pi r^2$	$C = \pi d$ or $C = 2\pi r$

SEMICIRCLES

A ***semicircle*** is half of a circle. To find the area of a semicircle, find the area of the full circle and divide by 2. To find the perimeter of a semicircle, find the circumference of the circle, divide by 2, and then add the length of the diameter.

Example 1: Find the area of the blue semicircle.

Step 1: Find the area of the full circle. The diameter is 20 cm, so the radius is 10 cm.



$$A = \pi r^2$$
$$A \approx 3.14(10\text{ cm})^2$$
$$A \approx 3.14(100\text{ cm}^2)$$
$$A \approx 314\text{ cm}^2$$

The symbol ≈ means "approximately equal to."

Step 2: Divide the area of the circle by 2. $314\text{ cm}^2 \div 2 = 157\text{ cm}^2$

The area of the blue semicircle is approximately 157 cm^2.

Example 2: Find the perimeter of the yellow semicircle.

Step 1: Find the circumference of a full circle with a diameter of 8 in.

$$C = \pi d$$
$$C \approx 3.14(8\text{ in})$$
$$C \approx 25.12\text{ in}$$

Step 2: Divide the circumference of the circle by 2.

$25.12\text{ in} \div 2 = 12.56\text{ in}$

Step 3: Add the length of the diameter. $12.56\text{ in} + 8\text{ in} = 20.56\text{ in}$

The perimeter of the yellow semicircle is approximately 20.56 in.

Circles in the Snow

Practice

Write the two formulas used to find the circumference of a circle. ________ and ________

Write the formula used to find the area of a circle. ________

Snowmen are created with three-dimensional balls of snow, but when you look at them on paper, the spheres look like circles! Using the information on the picture, fill in the blanks for each circle or semicircle.

Circle A

radius = ________

diameter = ________

circumference ≈ ________

Circle B

radius = ________

diameter = ________

area ≈ ________

Semicircle C

radius = ________

perimeter ≈ ________

area ≈ ________

Circle D

radius = ________

circumference ≈ ________

area ≈ ________

Circle E

diameter = ________

circumference ≈ ________

area ≈ ________

Semicircle F

diameter = ________

perimeter ≈ ________

area ≈ ________

Circle G

diameter = ________

area ≈ ________

circumference ≈ ________

Semicircle H

radius = ________

area ≈ ________

perimeter ≈ ________

Review

1. Convert each percent to a decimal. Lesson 23

0.32% = ________ 921.12% = ________ 9% = ________

2. Convert each fraction or mixed number to a percent. Lesson 24

$2\frac{3}{8} =$ ________ $\frac{7}{10} =$ ________ $\frac{13}{50} =$ ________

3. Find the missing angle measure for each triangle. Lesson 39

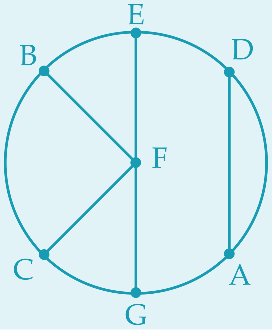
19°, 32°, ________ 41°, 124°, ________

4. Circle *yes* if the angles listed can form a quadrilateral and *no* if they cannot. Lesson 40

69°, 91°, 100°, 99° *yes* *no*

52°, 154°, 39°, 115° *yes* *no*

5. Name the following parts found on ⊙F. Lesson 41



1 diameter: ________

3 radii: ________

1 chord: ________

3 central angles:

____

Lesson 45

ARCHES National Park PUZZLES

There is no video or review for this lesson.

Complete the three puzzles.

Arches National Park is located in southeastern Utah, USA. There are more than 2,000 arches in the park. The exact number changes as new arches are discovered and others fall.

1 FOUR FAMILIES visited Arches National Park, and each family hiked a different trail. Find out which family hiked which trail and the distance they hiked by solving the logic puzzle on the right. Note that these hike distances are actual round-trip distances.

☐ The Taylor family did not hike to Tower Arch.

☐ The Wang family hiked the farthest.

☐ The Garcia family hiked farther than the Taylor family.

☐ The Hansen family includes a toddler, so they hiked less than one mile.

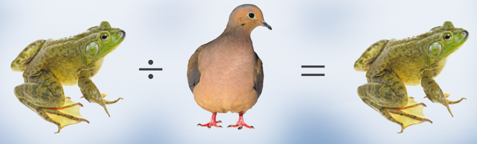
☐ The Park Avenue trail is one mile each way.

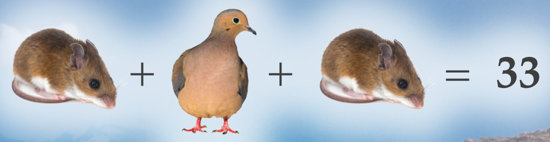
☐ The Tower Arch trail is shorter than the Delicate Arch trail but longer than the Park Avenue trail.

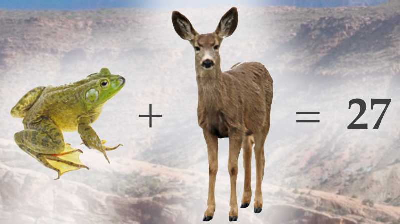
		Hike Distance				Trail			
		0.4 miles	2 miles	2.6 miles	3 miles	DELICATE ARCH	SKYLINE ARCH	PARK AVENUE	TOWER ARCH
Family	Taylor								
	Wang								
	Garcia								
	Hansen								
Trail	DELICATE ARCH								
	SKYLINE ARCH								
	PARK AVENUE								
	TOWER ARCH								

Hint: Put an X in a box if it can be ruled out and a ✓ in a box if you are sure of an answer.

2 FIND THE NUMERIC VALUE of each animal found in Arches National Park. Note that this puzzle may require some guess and check. Use what you know and keep trying different combinations of numbers!







You will know you are correct if your solutions make the following equation true.

3 THE MOHAMED FAMILY is fortunate to live within driving distance of Arches National Park. They have set aside three Saturdays in June for hiking in the park, and their goal is to hike 15 miles that month. Using the numbers 1–4 and 6–9 exactly once, complete the puzzle to find four combinations of three hike lengths that would total 15 miles. In other words, each line of numbers should add up to 15. The center number is given for you.

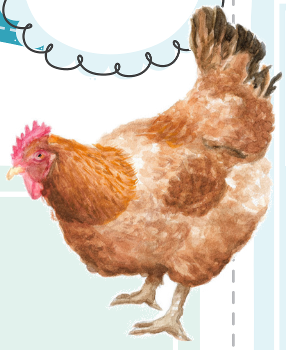
Lesson 46

COMBINING LIKE TERMS

Supplies

colored pencils

☐ Watch the video lesson and/or read the mini lesson.



Warm-Up

Complete the following problems.

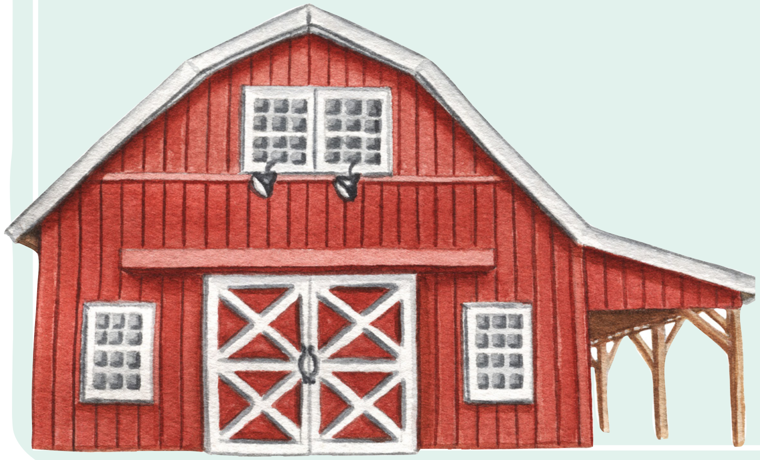
$2+(-3)=$ _____

$-8-4=$ _____

$-5+7=$ _____

$-6-(-10)=$ _____

$5+4-2-7=$ _____



Video Lesson

Scan the QR code or watch the video lesson on goodandbeautiful.com/Math6.

$5-3a+b+4a$

$-2m+10m+18$

Mental Math Checkup

Complete each division fact in your head, and then write the answer in the box.

$60 \div 5 =$ ☐

$96 \div 12 =$ ☐

$121 \div 11 =$ ☐

$72 \div 6 =$ ☐

$132 \div 12 =$ ☐

$54 \div 6 =$ ☐

$72 \div 12 =$ ☐

$108 \div 12 =$ ☐

$144 \div 12 =$ ☐

$81 \div 9 =$ ☐

$63 \div 9 =$ ☐

$56 \div 7 =$ ☐

Mini Lesson

Like Terms

Like terms are terms with the same variable raised to the same power.

Like Terms	Unlike Terms
$2a$ and $3a$ Both variables are a to the first power. Like terms can have different coefficients.	$7a$ and b The variables are different.
$4c$, c, and $-9c$ All variables are c to the first power.	$5c$ and 11 There is a variable and a constant.
$2d^2$ and $7d^2$ Both variables are d squared.	$3d^2$ and d^5 Both variables are d, but they are raised to different powers.

Combining Like Terms

Combining like terms is a way to simplify an expression, and often this makes it easier to solve an equation.

When combining like terms, it can be helpful to think of a variable as an object.

Example: Simplify the expression $2c + 3c$.
Suppose c stands for cows.
2 cows plus 3 cows is 5 cows.
$2c + 3c = 5c$

It may also be helpful to write products as repeated addition.

Example: Simplify the expression $4s - s$.
$s + s + s + s - s$
$s + s + s + \cancel{s} - \cancel{s} = 3s$
$4s - s = 3s$

When a variable has no number written in front of it, the coefficient is 1.

Rewrite expressions so like terms are next to each other.

Example: Simplify the expression $5p + 4c - 2p$.

- Rearrange the terms.

$$5p - 2p + 4c$$

- Combine like terms.

Suppose p stands for pigs and c stands for chickens.

5 pigs − 2 pigs + 4 chickens =
3 pigs + 4 chickens
OR

$$p + p + p + p + p - p - p + c + c + c + c$$
$$p + p + p + \cancel{p} + \cancel{p} - \cancel{p} - \cancel{p} + c + c + c + c =$$
$$3p + 4c$$
$$5p - 2p + 4c = 4c + 3p$$

Note: When writing answers with variables, it is best practice to write the variables in alphabetical order. If there is a constant, write it after the variable(s).

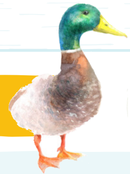
Like terms can be combined by adding or subtracting the coefficients.

Examples:

$7x + 2x$ $= 9x$	Since $7x$ and $2x$ are like terms, add 7 and 2. $7x + 2x = 9x$
$5y + 3 - y$ $= 5y - y + 3$ $= 4y + 3$	Rewrite the expression. Since $5y$ and y are like terms, subtract 1 from 5. $5y + 3 - y = 4y + 3$

List terms with variables in alphabetical order with constants at the end.

Practice



1. Color boxes with like terms in the same color. For example, use one color for like terms with the variable b and another color for like terms with the variable d.

$5a$	b	$8c$	$-b$	$3a$
$4c$	$-9d$	$3d$	d	c
$-3b$	$2d$	a	$-d$	$7b$
$2c$	$4d$	$-5d$	$6d$	$5c$
$4a$	$2b$	$-c$	$4b$	$-2a$

Hint: You'll use four different colors.

2. Combine like terms to simplify the expressions. The first is given as an example.

$a + a + a$ ___3a___

$g + g + g + g$ _____

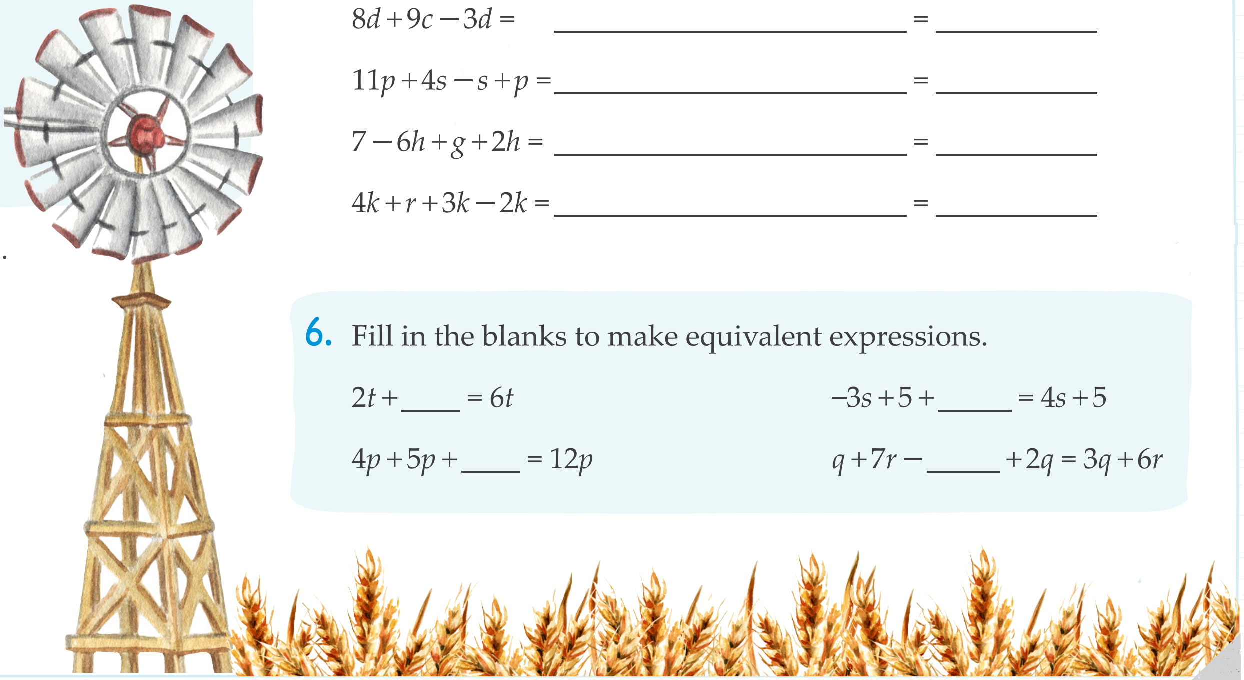
$r + r + r + r + r + r$ _____

$m + m$ _____

$x + x + x + x + x$ _____

3. Draw lines to connect equivalent expressions.

$5n + 3n$	$10n$
$4n - 2n$	$8n$
$n + 9n$	$4n$
$8n - 2n$	$6n$
$3n + n$	n
$6n - 5n$	$2n$



4. Simplify the expressions.

$8y + 2y$ __________

$-7v + 12v + 4$ __________

$9z - 4 + 8$ __________

$w + 3w + 4w$ __________

$5x + 3x$ __________

$6t + 2 + 5t - 3$ __________

$20u - 19u - 2$ __________

$6 + 7p - 4$ __________

5. Rewrite the expressions so like terms are next to each other. Then simplify the expressions. The first one is given as an example.

$3x + 4y + 5x =$ ___3x + 5x + 4y___ = ___8x + 4y___

$a + 3b + 2a - b =$ ____________________ = __________

$8d + 9c - 3d =$ ____________________ = __________

$11p + 4s - s + p =$ ____________________ = __________

$7 - 6h + g + 2h =$ ____________________ = __________

$4k + r + 3k - 2k =$ ____________________ = __________

6. Fill in the blanks to make equivalent expressions.

$2t +$ _____ $= 6t$

$4p + 5p +$ _____ $= 12p$

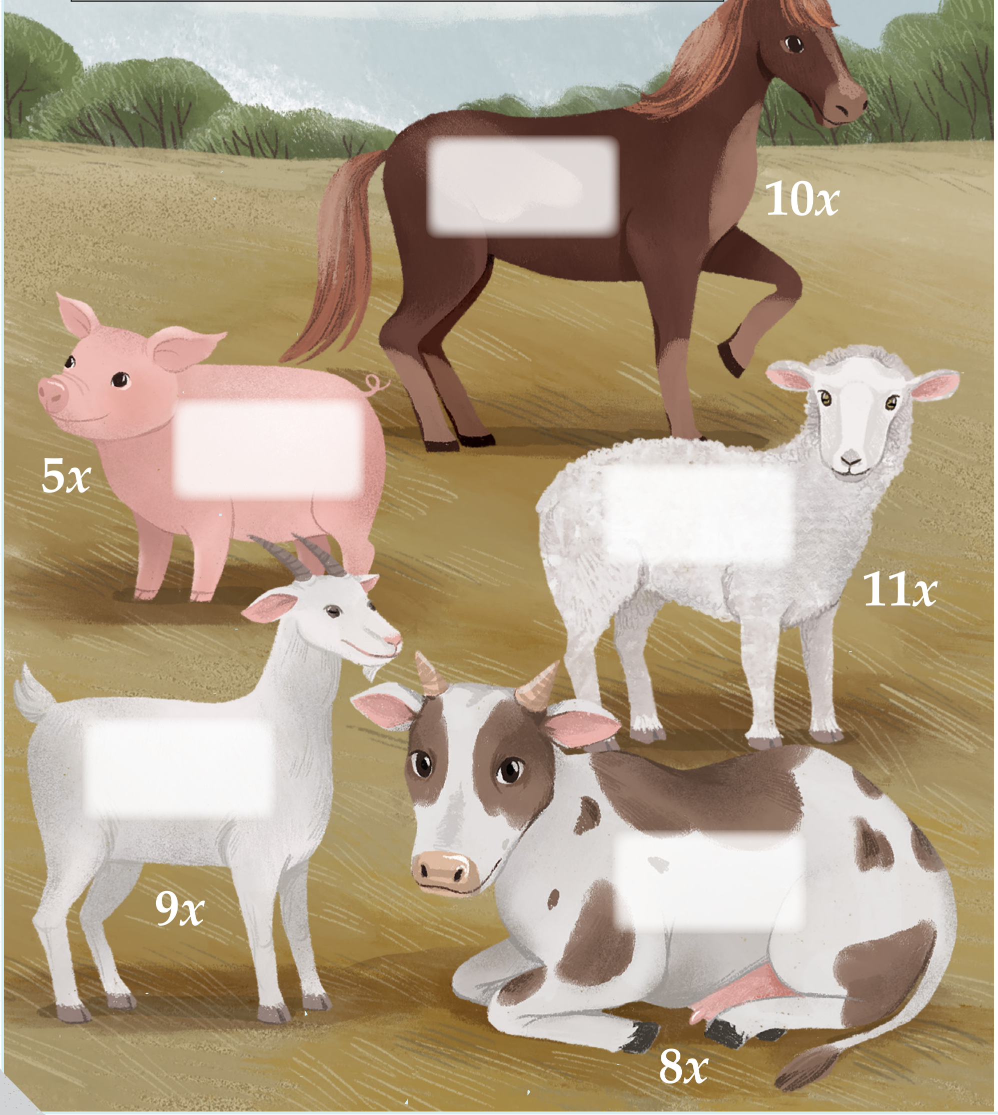
$-3s + 5 +$ _____ $= 4s + 5$

$q + 7r -$ _____ $+ 2q = 3q + 6r$

Practice

7. Use terms from the box and addition or subtraction to create TWO expressions that are equivalent to the expression listed by each animal. Write the expressions on each animal. For example, if the expression by the animal was $7x$, you could write $10x - 3x$ and $5x + 2x$ on the animal. For an extra challenge, try to write expressions with three terms on some of the animals.

$5x \quad 2x \quad -3x \quad x \quad 10x \quad 12x \quad -2x \quad -x \quad 6x \quad 4x \quad 7x \quad 3x$



Review

1. Complete each problem. Lesson 20

$14 - 3(4) + 5^2 =$

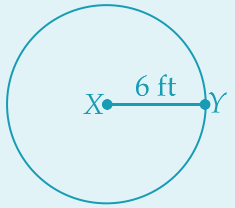
$56 \div 7 + 2^3 - 11 =$

2. Simplify each expression. Lesson 20

$\frac{\sqrt[3]{27}}{2^3 + 1} =$

$\frac{2^4 \div 8}{\sqrt[3]{125} - 4} =$

3. Use $\odot X$ to fill in the information. Lesson 42



radius = ____________________

diameter = ____________________

area ≈ ____________________

circumference ≈ ______________

4. Write *yes* or *no* on each line. Lesson 43

Is $a = 18$ a solution to the equation $a \div 3 = 9$? ______

Is $b = 2.3$ a solution to the equation $5 - b = 2.7$? ______

5. Find the percent of each number. Lesson 44

What is 25% of 120? ________

What is 15% of 75? ________

What is 90% of 8? ________

Lesson 51

SOLVING EQUATIONS WITH DECIMALS & FRACTIONS

☐ Watch the video lesson and/or read the mini lesson.

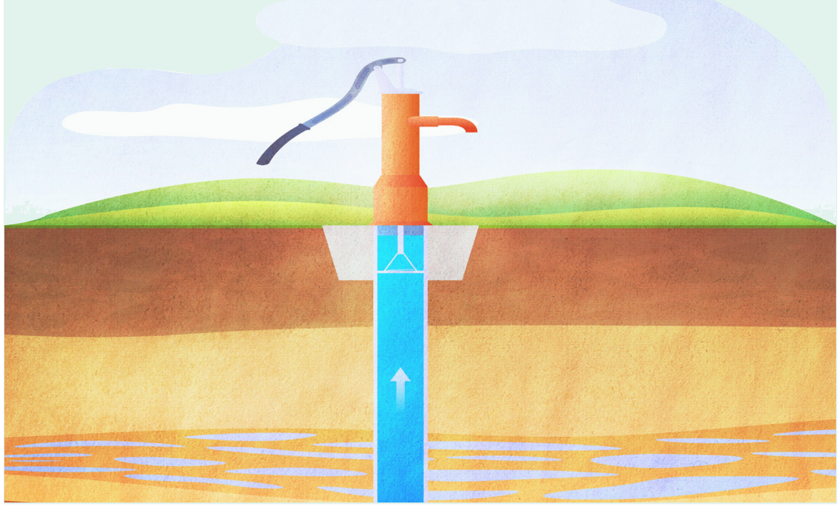
Warm-Up

Complete the following problems.

$0.05 + 0.4 =$ ________

$0.05 \bullet 0.4 =$ ________

$0.05 \div 0.4 =$ ________



Video Lesson

Scan the QR code or watch the video lesson on goodandbeautiful.com/Math6.

Mental Math Checkup

1. Evaluate the following.

$\sqrt{81} =$ ☐ $\sqrt{16} =$ ☐

2. Fill in the missing operations that make the equation true.

3 ☐ 8 = 6 ☐ 4

3. Start at 0. Perform each operation in the following order:

×12, +9, ×3, +3, ÷5 ☐

Mini Lesson

Solving Equations with Decimals

Solving equations with decimals is similar to solving equations with whole numbers. Just remember a few decimal rules:

Add/Subtract	Multiply	Divide
line up the decimal points	multiply, then count decimal places	move the decimal point in the divisor & dividend
$\begin{array}{r} 0.03 \\ +0.20 \\ \hline 0.23 \end{array}$	$\begin{array}{r} 0.03 \\ \times 0.2 \\ \hline 0.006 \end{array}$	$0.2\overline{)0.03} \rightarrow \begin{array}{r} 0.15 \\ 2\overline{)0.30} \end{array}$

Examples of Equations with Decimals

$x + 4.2 = 5$

$x + \cancel{4.2} = \overset{4}{\cancel{5}}.{}^{1}0$

$\underline{-\cancel{4.2}\quad -4.2}$

$x = 0.8$

$5.6 + x = 8.72$

$\cancel{5.6} + x = 8.72$

$\underline{-\cancel{5.6}\quad -5.60}$

$x = 3.12$

$3.2x = 4$

$\frac{\cancel{3.2}x}{\cancel{3.2}} = \frac{4}{3.2}$

scratch work

$3.2\overline{)4.0}$

$\begin{array}{r} 1.25 \\ 32\overline{)40.00} \end{array}$

$x = 1.25$

$5x = 4.5$

$\frac{\cancel{5}x}{\cancel{5}} = \frac{4.5}{5}$

scratch work

$\begin{array}{r} 0.9 \\ 5\overline{)4.5} \end{array}$

$x = 0.9$

$\frac{x}{1.2} = 8$

$\cancel{1.2} \cdot \frac{x}{\cancel{1.2}} = 8 \cdot 1.2$

scratch work

$\begin{array}{r} {}^{1} \\ 1.2 \\ \times\ 8 \\ \hline 9.6 \end{array}$

$x = 9.6$

Solving Equations with Fractions

When a coefficient is a fraction, multiply the coefficient by its reciprocal to isolate the variable. Then multiply the other side by the same number.

Example:

$\frac{2}{3}x = 4$ Multiply by the reciprocal of the coefficient.

$\frac{\cancel{3}}{\cancel{2}} \cdot \frac{\cancel{2}}{\cancel{3}}x = \frac{\overset{2}{\cancel{4}}}{1} \cdot \frac{3}{\underset{1}{\cancel{2}}}$ Cancel first; then multiply.

$x = \frac{6}{1}$ Simplify the fraction.

$x = 6$

A number multiplied by its reciprocal is 1.

Additional Examples of Equations with Fractions

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

$x + \cancel{\frac{1}{4}} = \frac{2}{3}$

$\underline{-\cancel{\frac{1}{4}}\quad -\frac{1}{4}}$

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

$x = \frac{8}{12} - \frac{3}{12}$

$x = \frac{5}{12}$

$x - 6 = \frac{3}{5}$

$x \cancel{-6} = \frac{3}{5}$

$\underline{\cancel{+6}\quad +6}$

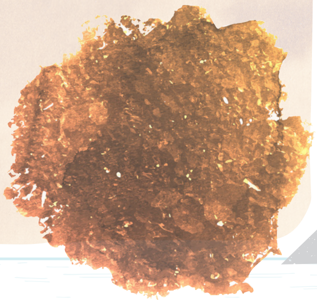
$x = \frac{3}{5} + 6$

$x = 6\frac{3}{5}$

$\frac{3}{4}x = \frac{5}{8}$

$\frac{\cancel{4}}{\cancel{3}} \cdot \frac{\cancel{3}}{\cancel{4}}x = \frac{5}{\underset{2}{\cancel{8}}} \cdot \frac{\overset{1}{\cancel{4}}}{3}$

$x = \frac{5}{6}$



DEEP DECIMALS

Find the value of each variable.

$h - 1.4 = 3$

$h =$ ______

$3.1 + f = 4.5$

$f =$ ______

$8.02 = g + 7.3$

$g =$ ______

$j - 1.63 = 7$

$j =$ ______

$2c = 5$

$c =$ ______

$4b = 5.28$

$b =$ ______

$20 = 2.5d$

$d =$ ______

$12 = 0.8a$

$a =$ ______

$\frac{p}{5} = 1.4$

$p =$ ______

$10 = \frac{m}{2.2}$

$m =$ ______

$\frac{n}{6} = 3.6$

$n =$ ______

$\frac{q}{4.2} = 2.5$

$q =$ ______

$\frac{3}{4}w = 6$

$w =$ ______

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

$z =$ ______

$2 = \frac{4}{5}x$

$x =$ ______

$\frac{7}{9}y = \frac{14}{3}$

$y =$ ______

$s - \frac{5}{8} = 9$

$s =$ ______

$u + \frac{1}{3} = \frac{7}{6}$

$u =$ ______

$t - 4 = \frac{2}{9}$

$t =$ ______

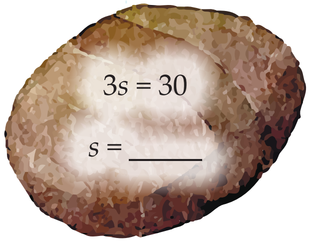
$\frac{2}{3} + v = \frac{4}{5}$

$v =$ ______

Rock Equations

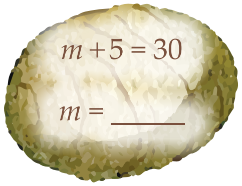
Practice

The earth's crust is thickest beneath mountains in the Himalayas and thinnest in the ocean. Solve the equations on the rocks to find the average thickness of the crust below land and below the ocean.



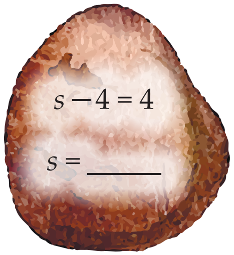
$3s = 30$

$s =$ ______



$m + 5 = 30$

$m =$ ______

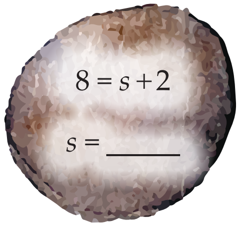


$s - 4 = 4$

$s =$ ______

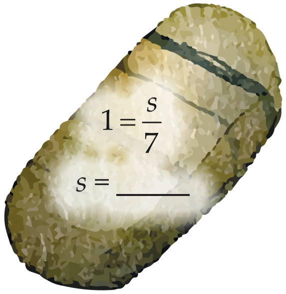
$m - 2 = 17$

$m =$ ______



$8 = s + 2$

$s =$ ______

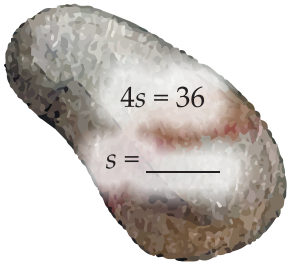


$1 = \frac{s}{7}$

$s =$ ______

$\frac{m}{15} = 2$

$m =$ ______



$4s = 36$

$s =$ ______

The crust below land is about ________ km (________ mi) thick.
largest value of m smallest value of m

The crust below the ocean is about _______ km (_______ mi) thick.
largest value of s smallest value of s

Review

1. Nico had 54 baseball trading cards. He was given c trading cards for Christmas. Write an expression that shows how many trading cards Nico has now. Lesson 34

2. On the first line, substitute the given values in place of the variables. On the second line, evaluate the expression. Lesson 35

$a^2 - 2b + 7$ $a = 5, b = 11$ ____________________ ______

3. Factor each expression. Lesson 48

$8 + 12 =$ $10 + 75 =$

4. Lola made n cupcakes for a bake sale. She sold 19 cupcakes and has 16 left to sell. Write and solve an equation to find the number of cupcakes Lola made. Lesson 49

5. Solve each equation. Lesson 50

$9a = 81$ $11b = 132$ $65 = 5c$

$a =$ ______ $b =$ ______ $c =$ ______

Lesson 56

COMPLEX FRACTIONS

☐ Watch the video lesson and/or read the mini lesson.

Warm-Up

Convert the mixed numbers to improper fractions.

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

$5\frac{4}{7} =$

$10\frac{2}{3} =$

$4\frac{6}{11} =$

Video Lesson

Scan the QR code or watch the video lesson on goodandbeautiful.com/Math6.

Mental Math Checkup

1. Evaluate the following.

   $\sqrt[3]{125} =$

   $\sqrt[3]{216} =$

2. What is $\frac{1}{7}$ of 21?

3. Start at 5. Perform each operation in the order given:

   +3, ×2, ÷4, −3, ×6

Mini Lesson

A fraction represents division. In a fraction the numerator is the dividend, and the denominator is the divisor. This means the numerator is divided by the denominator.

Examples:

$\frac{3}{7} = 3 \div 7$ $\qquad$ $\frac{8}{5} = 8 \div 5$ $\qquad$ $\frac{24}{6} = 24 \div 6$

Complex Fractions

A ***complex fraction*** is a fraction that has at least one fraction in its numerator and/or denominator.

The fractions below are complex fractions.

$\frac{\frac{1}{6}}{4}$ The numerator is a fraction.

$\frac{20}{\frac{4}{5}}$ The denominator is a fraction.

$\frac{\frac{7}{8}}{\frac{11}{16}}$ The numerator and denominator are fractions.

Simplifying a Complex Fraction

To simplify a complex fraction, divide the numerator by the denominator. Remember, dividing by a number is the same as multiplying by the reciprocal of that number.

Examples:

$$\frac{\frac{1}{6}}{4} = \frac{1}{6} \div 4$$
$$= \frac{1}{6} \bullet \frac{1}{4}$$
$$= \frac{1}{24}$$

$$\frac{20}{\frac{4}{5}} = 20 \div \frac{4}{5}$$
$$= \frac{\overset{5}{\cancel{20}}}{1} \bullet \frac{5}{\underset{1}{\cancel{4}}}$$
$$= \frac{25}{1}$$
$$= 25$$

$$\frac{\frac{7}{8}}{\frac{11}{16}} = \frac{7}{8} \div \frac{11}{16}$$
$$= \frac{7}{\underset{1}{\cancel{8}}} \bullet \frac{\overset{2}{\cancel{16}}}{11}$$
$$= \frac{14}{11}$$
$$= 1\frac{3}{11}$$

Mixed Numbers with Complex Fractions

If there is a mixed number in the numerator or denominator of a fraction, convert the mixed number to an improper fraction before dividing.

Examples:

$$\frac{2\frac{2}{9}}{\frac{5}{3}} = \frac{\frac{20}{9}}{\frac{5}{3}}$$
$$= \frac{20}{9} \div \frac{5}{3}$$
$$= \frac{\overset{4}{\cancel{20}}}{\underset{3}{\cancel{9}}} \bullet \frac{\overset{1}{\cancel{3}}}{\underset{1}{\cancel{5}}}$$
$$= \frac{4}{3}$$
$$= 1\frac{1}{3}$$

$$\frac{10}{1\frac{2}{3}} = \frac{10}{\frac{5}{3}}$$
$$= 10 \div \frac{5}{3}$$
$$= \frac{\overset{2}{\cancel{10}}}{1} \bullet \frac{3}{\underset{1}{\cancel{5}}}$$
$$= \frac{6}{1}$$
$$= 6$$

→ REMINDER ←

To convert a mixed number to an improper fraction, follow these steps:

1. Multiply the denominator by the whole number.
2. Add the product to the numerator.
3. Write the sum over the denominator.

Example:

$$\overset{+}{\underset{\times}{5}}\frac{3}{4} = \frac{23}{4}$$

Practice

1. Write the fractions as division problems. The first one is given as an example.

$\frac{6}{7} = 6 \div 7$

$\frac{4}{9} =$

$\frac{10}{3} =$

$\frac{5}{8} =$

2. Write the complex fractions as division problems.

$\frac{\frac{7}{8}}{15} =$

$\frac{9}{\frac{3}{7}} =$

$\frac{\frac{10}{7}}{\frac{2}{5}} =$

$\frac{\frac{12}{11}}{\frac{2}{9}} =$

3. Fill in the blank spaces to simplify the complex fractions. The first one is given as an example.

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

$= \frac{\overset{5}{\cancel{10}}}{3} \bullet \frac{1}{\underset{1}{\cancel{2}}}$

$= \frac{5}{3}$

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

$\frac{\frac{3}{5}}{9} = \square \div \square$

$= \square \bullet \square$

$= \square$

$\frac{8}{\frac{2}{3}} = \square \div \square$

$= \square \bullet \square$

$= \square$

$= \square$

$\frac{\frac{5}{6}}{\frac{5}{8}} = \square \div \square$

$= \square \bullet \square$

$= \square$

$= \square$

4. Simplify the complex fractions.

✦ Hint: First convert the mixed numbers to improper fractions.

$\frac{3\frac{3}{4}}{\frac{5}{8}} =$

$\frac{\frac{4}{7}}{5\frac{1}{3}} =$

$\frac{2\frac{1}{4}}{1\frac{4}{5}} =$

$\frac{7\frac{1}{3}}{11} =$

Practice

5. Fill in the missing measurements for four different rectangles. If the length is missing, divide the area by the width. If the width is missing, divide the area by the length.

Length	Width	Area
$\frac{3}{4}$ ft	$\frac{1}{2}$ ft	
	$\frac{4}{5}$ cm	2 cm^2
$4\frac{2}{3}$ in		$1\frac{5}{9}$ in^2
	3 m	$8\frac{1}{4}$ m^2

6. There are many chrysanthemums growing in the garden. Choose a chrysanthemum that is NOT yellow and divide its number by the number on a yellow flower. When you find and circle a pair of flowers that has a quotient of 5, YOU WIN and can move on to the review section. If the quotient isn't 5, try again. For an extra challenge, find TWO pairs of flowers with a quotient of 5.

Review

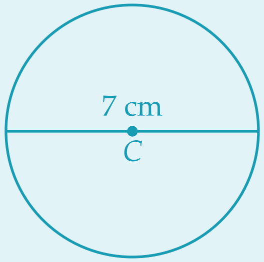
1. Find the missing angle measure for each triangle. Lesson 39

26°, 42°, _____ 50°, 45°, _____

2. Find the missing angle measure for each quadrilateral. Lesson 40

30°, 100°, 45°, _____ 122°, 75°, 105°, _____

3. Using ⊙C, fill in the blanks below. Lessons 41 & 42



radius = __________

diameter = __________

circumference ≈ __________

area ≈ __________

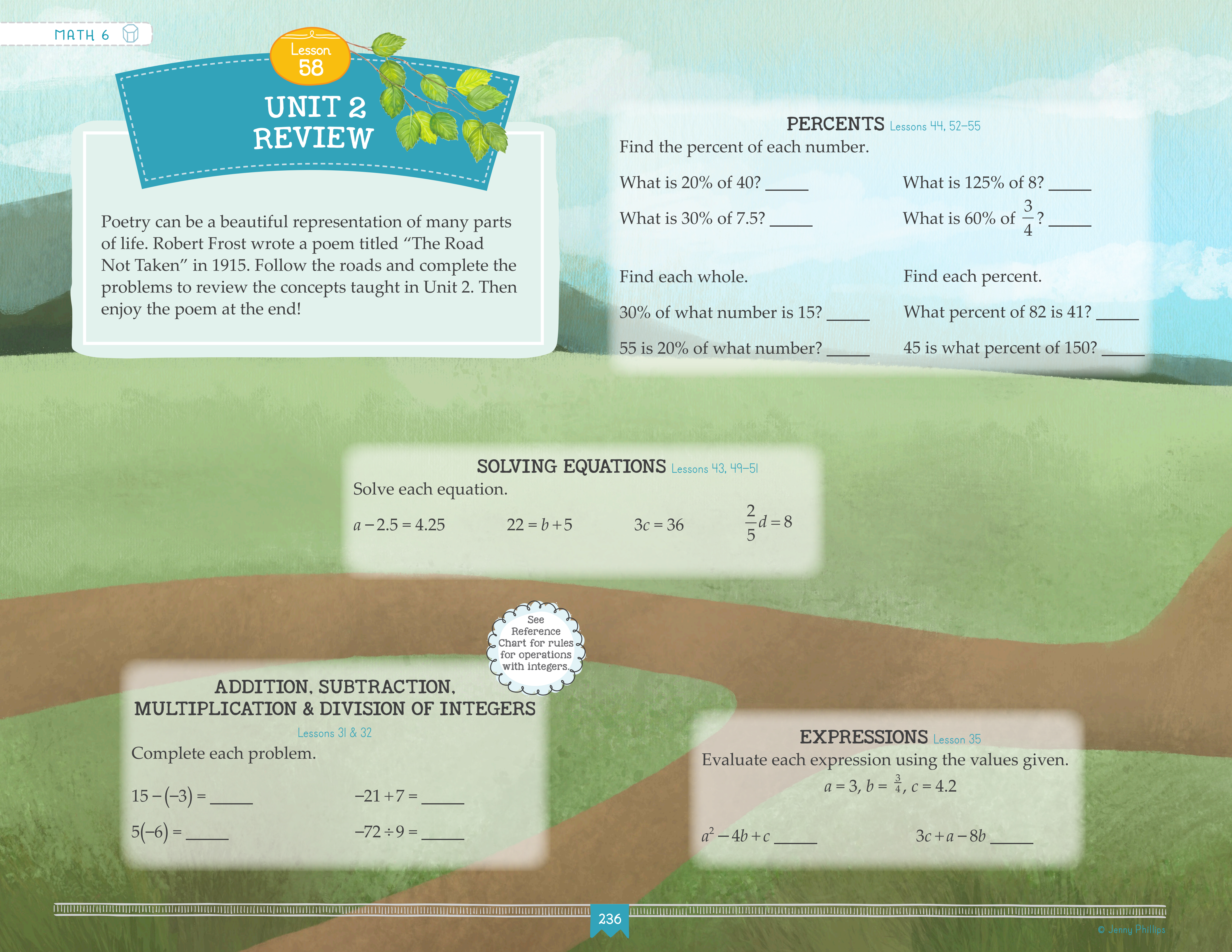
4. Find the percent of each number. Lesson 53

What is 50% of 1.3? What is 8% of 24.8?

5. Allison plays on a soccer team. On the team, 20% of the players are goalies. There are 3 goalies. How many players are on the team? Lesson 54

6. Write and solve an equation for each question. Lesson 55

What percent of 125 is 40? 14 is what percent of 20?



Lesson 58

UNIT 2 REVIEW

Poetry can be a beautiful representation of many parts of life. Robert Frost wrote a poem titled “The Road Not Taken” in 1915. Follow the roads and complete the problems to review the concepts taught in Unit 2. Then enjoy the poem at the end!

PERCENTS Lessons 44, 52–55

Find the percent of each number.

What is 20% of 40? _____

What is 125% of 8? _____

What is 30% of 7.5? _____

What is 60% of $\frac{3}{4}$? _____

Find each whole.

30% of what number is 15? _____

55 is 20% of what number? _____

Find each percent.

What percent of 82 is 41? _____

45 is what percent of 150? _____

SOLVING EQUATIONS Lessons 43, 49–51

Solve each equation.

$a - 2.5 = 4.25$

$22 = b + 5$

$3c = 36$

$\frac{2}{5}d = 8$

See Reference Chart for rules for operations with integers.

ADDITION, SUBTRACTION, MULTIPLICATION & DIVISION OF INTEGERS

Lessons 31 & 32

Complete each problem.

$15 - (-3) =$ _____

$-21 + 7 =$ _____

$5(-6) =$ _____

$-72 \div 9 =$ _____

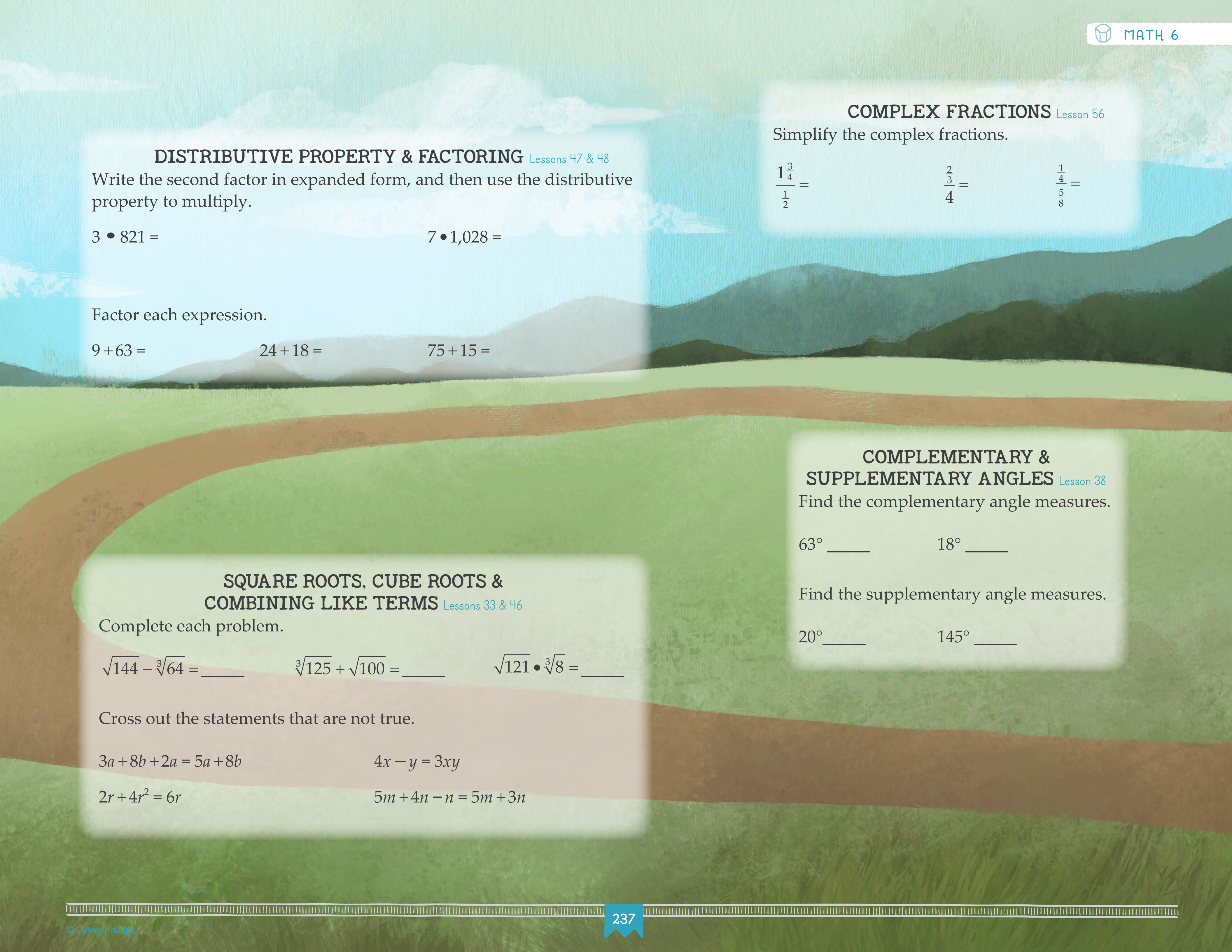
EXPRESSIONS Lesson 35

Evaluate each expression using the values given.

$a = 3, b = \frac{3}{4}, c = 4.2$

$a^2 - 4b + c$ _____

$3c + a - 8b$ _____



DISTRIBUTIVE PROPERTY & FACTORING Lessons 47 & 48

Write the second factor in expanded form, and then use the distributive property to multiply.

$3 \bullet 821 =$ $7 \bullet 1{,}028 =$

Factor each expression.

$9+63=$ $24+18=$ $75+15=$

SQUARE ROOTS, CUBE ROOTS & COMBINING LIKE TERMS Lessons 33 & 46

Complete each problem.

$\sqrt{144}-\sqrt[3]{64}=$_____ $\sqrt[3]{125}+\sqrt{100}=$_____ $\sqrt{121}\bullet\sqrt[3]{8}=$_____

Cross out the statements that are not true.

$3a+8b+2a=5a+8b$ $4x-y=3xy$

$2r+4r^2=6r$ $5m+4n-n=5m+3n$

COMPLEX FRACTIONS Lesson 56

Simplify the complex fractions.

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

COMPLEMENTARY & SUPPLEMENTARY ANGLES Lesson 38

Find the complementary angle measures.

63° _____ 18° _____

Find the supplementary angle measures.

20°_____ 145° _____

LESSONS 59–60

UNiT ASSESSMenT

Supplies
protractor
colored pencils (optional)

Instructions

Unit assessments give you practice with the math concepts learned in this unit without having you overpractice concepts that you have mastered. These assessments also give you practice working on math problems for an extended period of time. This helps you to extend focus and attention span and to be better prepared for any type of testing you will have to do in the future. Here are some tips: First, always read the instructions carefully. Sometimes you can get answers wrong simply because you did not understand the instructions. Second, do not rush through exercises you think you already know. Instead, do your work carefully. Sometimes you can get answers wrong, even though you understand the concept, just because you rushed. Finally, if you feel you are having trouble focusing, take a quick break to do something else, like ten jumping jacks, and then come back. There are no videos, mini lessons, or practice problems for Lessons 59–60.

For Lesson 59, complete all the exercises with purple headers only. You may cover the additional practice sections or fold the page to concentrate only on the purple sections. Have your parent or teacher correct the work. If there are mistakes in a section, your parent or teacher will check the orange "Additional Practice" checkbox for that section.

For Lesson 60, complete all the orange sections that are checked. If you still make multiple mistakes, review those sections. All the principles will be reviewed again in upcoming units. If you have only a few or no orange sections to practice, you may move on to the next lesson.

Parents/teachers may determine if the student may use the Reference Chart for the assessment. It is recommended that the student first try the assessment without the Reference Chart and then refer to it if needed.

Student

ADDITION, SUBTRACTION, MULTIPLICATION & DIVISION OF INTEGERS (LESSONS 31 & 32)

Complete each problem.

$5-8=$ _____

$-6-(-7)=$ _____

$-11+4=$ _____

$-3(9)=$ _____

$48\div(-12)=$ _____

$-81\div(-9)=$ _____

SQUARE & CUBE ROOTS (LESSON 33)

Complete each problem.

$\sqrt{144}+\sqrt[3]{8}=$ _____

$\sqrt[3]{125}\bullet\sqrt{225}=$ _____

$\sqrt[3]{1{,}000}-\sqrt{64}=$ _____

☐ Additional Practice

ADDITION, SUBTRACTION, MULTIPLICATION & DIVISION OF INTEGERS

Complete each problem.

See Reference Chart to review operations with integers.

$-14+5=$ _____

$-7-4=$ _____

$3-(-9)=$ _____

$11(-6)=$ _____

$-45\div9=$ _____

$-12(-5)=$ _____

☐ Additional Practice

SQUARE & CUBE ROOTS

square root: "What number multiplied by itself equals the number under the square root symbol?"

cube root: "What number multiplied three times equals the number under the cube root symbol?"

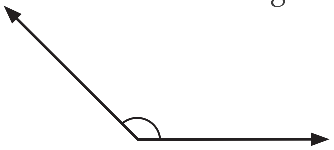
$\sqrt{100}-\sqrt[3]{27}=$ _____

$\sqrt{121}\bullet\sqrt[3]{64}=$ _____

$\dfrac{\sqrt{36}}{\sqrt[3]{8}}=$ _____

ANGLES
(LESSON 38)

Find the measure of the angle below.



______

Draw an angle that measures 70°.

Find the complementary angle measures.

50° ______ 86° ______

Find the supplementary angle measures.

20°______ 145° ______

EXPRESSIONS & COMBINING LIKE TERMS (LESSONS 34, 35 & 46)

Use the information to write each expression.

the sum of a number and twelve ________________

the product of thirty-four and a number ________________

Evaluate the expressions when $a = 2$, $b = \frac{1}{2}$, and $c = 3.5$.

$a^3 + 2b - c$ ______

$2c + a - 4b$ ______

Simplify the expressions by combining like terms.

$4a + 5b - a + b =$

$9 - 5d + c + 2d =$

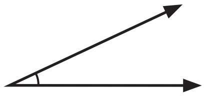
Additional Practice

ANGLES

complementary angles: two angles whose sum is 90°

supplementary angles: two angles whose sum is 180°

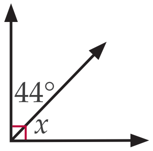
Find the measure of the angle below.



______

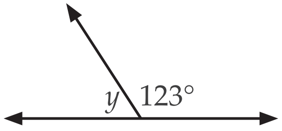
Draw an angle that measures 155°.

Find the measure of $\angle x$.



$m\angle x =$ ______

Find the measure of $\angle y$.



$m\angle y =$ ______

Additional Practice

EXPRESSIONS & COMBINING LIKE TERMS

like terms: terms with the same variables raised to the same power

Use the information to write each expression.

twice a number plus five ________________

the difference between a number and two ________________

Evaluate the expressions when $x = \frac{1}{4}$, $y = 5$, and $z = 2.5$.

$4x + y - z$ ______

$\frac{2z}{y}$ ______

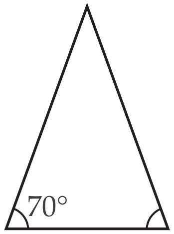
Fill in the blanks to make equivalent expressions.

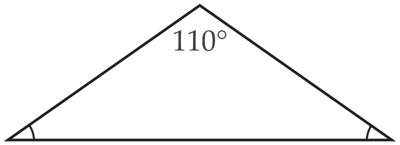
$3g +$ ______ $= 11g$

$k - 5m +$ ______ $- m = 4k - 6m$

INTERIOR ANGLES OF TRIANGLES & QUADRILATERALS (LESSONS 39 & 40)

Write the missing angle measures on each isosceles triangle.





Find the missing angle measures needed to form quadrilaterals.

60°, 130°, 70°, ______

102°, 102°, 78°, ______

SOLVING EQUATIONS

(LESSONS 43 & 49–51)

Solve each equation.

$a + 12 = 15.5$

$10 = b - 7$

$8c = 48$

$\frac{3}{4}d = 9$

DISTRIBUTIVE PROPERTY

(LESSON 47)

Use the distributive property to multiply.

$7(8 + 3 - 5) =$

$11(12 - 2 - 5) =$

Write the second factor in expanded form, and then use the distributive property to multiply.

$9 \bullet 326 =$

$8 \bullet 5{,}021 =$

Additional Practice

INTERIOR ANGLES OF TRIANGLES & QUADRILATERALS

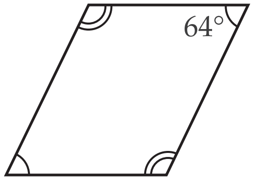
The sum of the interior angle measures of a triangle is 180°.
The sum of the interior angle measures of a quadrilateral is 360°.

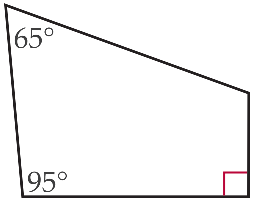
Find the missing angle measures needed to form triangles.

45°, 90°, ______

20°, 100°, ______

Write the missing angle measures on each quadrilateral.





Additional Practice

SOLVING EQUATIONS

Isolate the variable on one side of the equation. Any changes made to one side of an equation must be made to the other side.
Solve each equation.

$16 = a - 2.9$

$7b = 49$

$\frac{c}{8} = 4$

$d + \frac{1}{4} = \frac{2}{3}$

Additional Practice

DISTRIBUTIVE PROPERTY

Distribute the factor outside the parentheses to each value inside the parentheses. Pay close attention to the signs.
Use the distributive property to multiply.

$6(9 + 4 - 7) =$

$12(10 - 5 + 12) =$

Write the second factor in expanded form, and then use the distributive property to multiply.

$7 \bullet 1{,}208 =$

$11 \bullet 419 =$

REFERENCE CHART

The Good and the Beautiful
CURRICULUM

REFERENCE CHART

DIVISIBILITY RULES

A number is divisible by . . .

② if it is an even number.

③ if the sum of the digits is divisible by 3.

④ if the last two digits of the number are divisible by 4.

⑤ if it ends in either 0 or 5.

⑥ if it is divisible by both 2 and 3.

⑨ if the sum of the digits is divisible by 9.

⑩ if the number ends in 0.

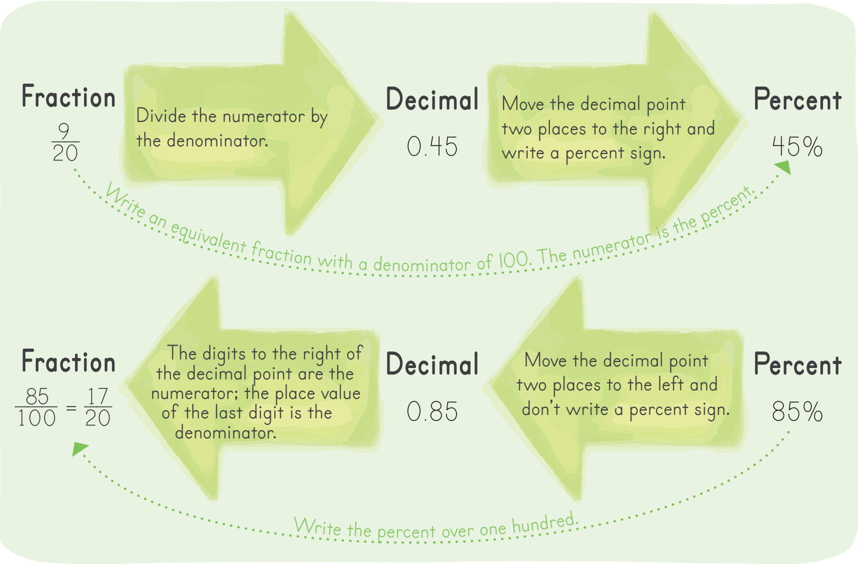
Order of Operations

Step 1: Perform all operations inside **parentheses**.

Step 2: Evaluate all **exponents**.

Step 3: Perform all **multiplication** and **division**, working from left to right.

Step 4: Perform all **addition** and **subtraction**, working from left to right.



Fraction $\frac{9}{20}$ → Divide the numerator by the denominator. → Decimal 0.45 → Move the decimal point two places to the right and write a percent sign. → Percent 45%

Write an equivalent fraction with a denominator of 100. The numerator is the percent.

Fraction $\frac{85}{100} = \frac{17}{20}$ ← The digits to the right of the decimal point are the numerator; the place value of the last digit is the denominator. ← Decimal 0.85 ← Move the decimal point two places to the left and don't write a percent sign. ← Percent 85%

Write the percent over one hundred.

Formulas

Area

rectangle: $A = bh$

square: $A = s^2$

parallelogram: $A = bh$

trapezoid: $A = \frac{1}{2}(b_1 + b_2)h$

triangle: $A = \frac{1}{2}bh$

Volume

volume of prisms and cylinders:
$V = \text{area of base} \bullet \text{height}$

Temperature

temperature conversion formulas:

$F = \frac{9}{5}C + 32$ $\quad$ $C = \frac{5}{9}(F - 32)$

Circles and Semicircles

circumference of a circle: $C = 2\pi r$ or $C = \pi d$

area of a circle: $A = \pi r^2$

area of semicircle: $A = \text{area of full circle} \div 2$

perimeter of semicircle: $P = \text{circumference} \div 2 + \text{diameter}$

Percent Equation: percent • whole = part

Common Conversions

$\frac{1}{2} = 0.5 = 50\%$

$\frac{1}{3} = 0.\overline{3} = 33.\overline{3}\%$

$\frac{2}{3} = 0.\overline{6} = 66.\overline{6}\%$

$\frac{1}{4} = 0.25 = 25\%$

$\frac{3}{4} = 0.75 = 75\%$

$\frac{1}{5} = 0.2 = 20\%$

$\frac{1}{8} = 0.125 = 12.5\%$

Measures of Central Tendency

mean
add then divide

median
in the middle

mode
most often

REFERENCE CHART

PROPERTIES

ASSOCIATIVE PROPERTY

Addition

$$(a+b)+c=a+(b+c)$$

Multiplication

$$(ab)c=a(bc)$$

COMMUTATIVE PROPERTY

Addition

$$a+b=b+a$$

Multiplication

$$ab=ba$$

DISTRIBUTIVE PROPERTY

Addition

$$a(b+c)=ab+ac$$

Subtraction

$$a(b-c)=ab-ac$$

IDENTITY PROPERTY

Addition

$$a+0=a$$

Multiplication

$$a\bullet 1=a$$

INVERSE PROPERTY

Addition

$$a+(-a)=0$$

Multiplication

$$a\bullet\frac{1}{a}=1$$

Perfect Squares and Cubes

x	x^2	x^3
1	1	1
2	4	8
3	9	27
4	16	64
5	25	125
6	36	216
7	49	343
8	64	512
9	81	729
10	100	1,000
11	121	
12	144	
13	169	
14	196	
15	225	

Rules for Adding and Subtracting Two Integers

Addition	
Same Signs	Different Signs
Add the numbers and keep the sign. $5+2=7$ $-5+(-2)=-7$	Subtract the numbers. Use the sign of the greater absolute value. $-2+6=4$ $2+(-6)=-4$

Subtraction
Add the opposite. Follow the addition rules. $7-(-4)=7+4=11$ $-3-8=-3+(-8)=-11$

Rules for Multiplying and Dividing Two Integers

Multiplication & Division	
Same Signs	Different Signs
Answer is positive. $5\bullet 2=10$ $(-5)\bullet(-2)=10$ $12\div 4=3$ $(-12)\div(-4)=3$	Answer is negative. $3\bullet(-6)=-18$ $(-3)\bullet 6=-18$ $8\div(-2)=-4$ $(-8)\div 2=-4$

CONVERSIONS

Weight
1 lb = 16 oz
1 tn = 2,000 lb

Length
1 ft = 12 in
1 yd = 3 ft = 36 in
1 mi = 1,760 yd = 5,280 ft = 63,360 in

Capacity
1 Tbsp = 3 tsp
1 c = 16 Tbsp
1 c = 8 fl oz
1 pt = 2 c
1 qt = 2 pt
1 gal = 4 qt

Metric Prefixes

kilo-	hecto-	deka-	base unit	deci-	centi-	milli-
1,000	100	10	1	$\frac{1}{10}$	$\frac{1}{100}$	$\frac{1}{1{,}000}$

base unit → gram (mass), meter (length), liter (capacity)