

Summer 7th grade Math packet

Dear Parents, Guardians and Students,

The 7th grade teachers at Rotolo Middle School are already busy preparing a great year for you! They have provided two opportunities for you to review essential math skills that will help you be successful in 7th grade. Your child may choose to complete **either** the Summer Packet or TenMarks online program. They are **not** required to do **BOTH**.

Summer Packet

This summer packet is designed to be a review of essential prerequisite math skills that are necessary for success in 7th grade math. This summer packet will not be assessed and will not count for a grade. However, all seventh grade teachers will collect this packet from students as it will be a reference throughout the school year (during class discussions, intervention planning purposes and for conferences with students and/or parents). For these reasons, students are strongly encouraged to complete this packet before the first day of school.

A calculator should not be necessary to complete problems in the packet. To provide feedback on student work, answers have been provided on the RMS website. Please check your child's work and mark incorrect answers with a colored writing utensil so students can correct any mistakes. If your child struggles with a particular skill, please visit www.7thgradesummermath.weebly.com for any assistance. Please send this packet with your child on the first day of school.

TenMarks Online Summer Program

Parents, we are very excited to inform you about a free program offered by TenMarks Education that will provide your child with access to a powerful, personalized summer math program designed to help them prepare for a successful school year. The expectation is for students to spend an **hour** per week on this program.

The program is called TenMarks Summer Math Program and here is how it works:

1. Visit <http://summer.tenmarks.com> and sign up.
 2. At the start of the program, your child will receive a short diagnostic assessment based on the grade s/he is entering this fall.
 3. The assessment will be automatically graded and TenMarks will create a personalized program designed for your child to prepare for the upcoming year.
 4. At the end of the summer, print the student report card and bring it to their 7th grade math teacher.
- The TenMarks Summer Math Program will guide your child through their personalized program, one topic at a time. Each assignment contains embedded instruction (hints, video lessons, and interventions) to help your child refresh concepts from the past year and prepare for the ones ahead. This will not count for a grade, however, teachers will review the student report card and will reference these skills throughout the school year.

Please choose **one** of the above opportunities to prepare your child for a successful year in 7th grade math. Another area of math you can help your student with is the mastery of the multiplication facts. Fluency of math facts is essential for success in math. One way students can practice their facts is log onto www.xtramath.org or www.aaamath.com. For aaamath.com go to sort by subject on the left hand side and pick an operation. In the middle of the page, click on the facts.

We look forward to meeting all of you in the upcoming school year. Enjoy your summer!

Kind Regards,
The Seventh Grade Math Department

Summer 8th grade Math packet

Dear Parents, Guardians, and Students,

The 8th grade teachers at Rotolo Middle School are already busy preparing a great year for you! They have provided two opportunities for you to review essential math skills that will help you be successful in 8th grade. Please choose **ONE** of the following, TenMarks online program or Summer Packet, to complete over the summer.

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Summer Packet

The second option is the completion of a summer packet that can be found online <http://rms.bps101.net/> (hard copies will be available in the main office at RMS throughout the summer). Please select the correct packet for the course you will be taking in 8th grade (Math 1 **OR** Math 2 **OR** Math 3).

It will not be assessed and will not count for a grade. However, teachers will collect completed packets and the skills reviewed will be referenced throughout the school year. Please bring the completed packet to school on the first day.

Each new topic in the packet has an example and a hint on how to solve the problems on the page. Please read them carefully before answering the problems.

Parents, so you know how well-prepared your child is for 8th grade math, please check the answers and mark incorrect answers with a colored pen. If your child is struggling with a particular topic please encourage your child to redo the problems associated with that skill. An additional resource that your child may find helpful is www.khanacademy.org.

****Please choose ONE** of the above opportunities to prepare your child for a successful year in 8th grade math.

Reminder: In the fall, please bring back a printed report card from TenMarks **OR** the completed paper copy of the summer packet. Your math teacher will be collecting this on the first day of school!

We look forward to meeting all of you in the upcoming school year. Enjoy your summer!

Thank you,
Your Eighth Grade Math teachers

Rounding Decimals

Rounding Decimals

Round 8.135 to the nearest tenth.

$$8.135 \rightarrow 8.1$$


less than 5

Round 32.56713 to the nearest hundredth.

$$32.56713 \rightarrow 32.57$$


greater than 5

Round to the nearest whole number.

1. $41.803 =$

2. $119.63 =$

3. $20.05 =$

4. $3.45 =$

5. $79.531 =$

6. $8.437 =$

7. $29.37 =$

8. $109.96 =$

Round to the nearest tenth.

9. $33.335 =$

10. $1.861 =$

11. $99.96 =$

12. $103.103 =$

13. $16.031 =$

14. $281.05 =$

15. $8.741 =$

16. $27.773 =$

Round to the nearest hundredth.

17. $69.713 =$

18. $5.569 =$

19. $609.906 =$

20. $247.898 =$

21. $5.535 =$

22. $67.1951 =$

23. $14.0305 =$

24. $6.9372 =$

Multiplying and Dividing by 10, 100, etc.

When multiplying by a power of 10, move the decimal to the right:

$$34.61 \times 10 \rightarrow \text{move 1 place} \rightarrow 346.1$$

$$6.77 \times 100 \rightarrow \text{move 2 places} \rightarrow 677$$

When dividing by a power of 10, move the decimal to the left:

$$7.39 \div 100 \rightarrow \text{move 2 place} \rightarrow 0.0739$$

$$105.61 \div 1000 \rightarrow \text{move 3 places} \rightarrow 0.10561$$

1. $4.81 \times 100 =$

10. $90,000 \div 100 =$

2. $37.68 \div 10 =$

11. $0.000618 \times 1,000 =$

3. $0.46 \times 1,000 =$

12. $39.006 \div 1,000 =$

4. $7.12 \div 10,000 =$

13. $16 \times 100 =$

5. $5.4 \times 10 =$

14. $28.889 \div 10,000 =$

6. $27,500 \div 1,000 =$

15. $36.89 \times 10,000 =$

7. $4.395 \times 100,000 =$

16. $0.091 \div 100 =$

8. $0.0075 \div 100 =$

17. $0.0336 \times 100,000 =$

9. $2.274 \times 10 =$

18. $1,672 \div 100,000 =$

1-2**Study Guide and Intervention****Powers and Exponents**

$$\begin{array}{c}
 \text{Exponent} \\
 \swarrow \\
 3^4 = 3 \cdot 3 \cdot 3 \cdot 3 = 81 \\
 \downarrow \quad \underbrace{\hspace{2cm}} \\
 \text{Base} \quad \text{common factors}
 \end{array}$$

The **exponent** tells you how many times to use the **base** as a factor.

EXAMPLE 1 Write 6^3 as a product of the same factor.

The base is 6. The exponent 3 means that 6 is used as a factor 3 times.

$$6^3 = 6 \cdot 6 \cdot 6$$

EXAMPLE 2 Evaluate 5^4 .

$$\begin{aligned}
 5^4 &= 5 \cdot 5 \cdot 5 \cdot 5 \\
 &= 625
 \end{aligned}$$

EXAMPLE 3 Write $4 \cdot 4 \cdot 4 \cdot 4 \cdot 4$ in exponential form.

The base is 4. It is used as a factor 5 times, so the exponent is 5.

$$4 \cdot 4 \cdot 4 \cdot 4 \cdot 4 = 4^5$$

EXERCISES

Write each power as a product of the same factor.

1. 7^3

2. 2^7

3. 9^2

4. 15^4

Evaluate each expression.

5. 3^5

6. 7^3

7. 8^4

8. 5^3

Write each product in exponential form.

9. $2 \cdot 2 \cdot 2 \cdot 2$

10. $7 \cdot 7 \cdot 7 \cdot 7 \cdot 7 \cdot 7$

11. $10 \cdot 10 \cdot 10$

12. $9 \cdot 9 \cdot 9 \cdot 9 \cdot 9$

13. $12 \cdot 12 \cdot 12$

14. $5 \cdot 5 \cdot 5 \cdot 5$

15. $6 \cdot 6 \cdot 6 \cdot 6 \cdot 6$

16. $1 \cdot 1 \cdot 1 \cdot 1 \cdot 1 \cdot 1 \cdot 1 \cdot 1$

1-3

Study Guide and Intervention
Order of Operations

Use the **order of operations** to evaluate numerical expressions.

1. Do all operations within grouping symbols first.
2. Evaluate all powers before other operations.
3. Multiply and divide in order from left to right.
4. Add and subtract in order from left to right.

EXAMPLE 1 Evaluate $(10 - 2) - 4 \cdot 2$.

$$\begin{aligned} (10 - 2) - 4 \cdot 2 &= 8 - 4 \cdot 2 && \text{Subtract first since } 10 - 2 \text{ is in parentheses.} \\ &= 8 - 8 && \text{Multiply 4 and 2.} \\ &= 0 && \text{Subtract 8 from 8.} \end{aligned}$$

EXAMPLE 2 Evaluate $8 + (1 + 5)^2 \div 4$.

$$\begin{aligned} 8 + (1 + 5)^2 \div 4 &= 8 + 6^2 \div 4 && \text{First, add 1 and 5 inside the parentheses.} \\ &= 8 + 36 \div 4 && \text{Find the value of } 6^2. \\ &= 8 + 9 && \text{Divide 36 by 4.} \\ &= 17 && \text{Add 8 and 9.} \end{aligned}$$

EXERCISES

Evaluate each expression.

- | | | |
|--------------------------------|------------------------------|---------------------------|
| 1. $(1 + 7) \times 3$ | 2. $28 - 4 \cdot 7$ | 3. $5 + 4 \cdot 3$ |
| 4. $(40 \div 5) - 7 + 2$ | 5. $35 \div 7(2)$ | 6. 3×10^3 |
| 7. $45 \div 5 + 36 \div 4$ | 8. $42 \div 6 \times 2 - 9$ | 9. $2 \times 8 - 3^2 + 2$ |
| 10. $5 \times 2^2 + 32 \div 8$ | 11. $3 \times 6 - (9 - 8)^3$ | 12. 3.5×10^2 |

1-4**Study Guide and Intervention****Adding Integers**

To add integers with the same sign, add their absolute values. Give the result the same sign as the integers.

EXAMPLE 1 Find $-3 + (-4)$.

$-3 + (-4) = -7$ Add $|-3| + |-4|$. Both numbers are negative, so the sum is negative.

To add integers with different signs, subtract their absolute values. Give the result the same sign as the integer with the greater absolute value.

EXAMPLE 2 Find $-16 + 12$.

$-16 + 12 = -4$ Subtract $|12|$ from $|-16|$. The sum is negative because $|-16| > |12|$.

EXERCISES

Add.

1. $9 + 16$

2. $-10 + (-10)$

3. $18 + (-26)$

4. $-23 + (-15)$

5. $-45 + 35$

6. $39 + (-38)$

7. $-55 + 81$

8. $-61 + (-39)$

9. $-74 + 36$

10. $5 + (-4) + 8$

11. $-3 + 10 + (-6)$

12. $-13 + (-8) + (-12)$

13. $3 + (-10) + (-16) + 11$

14. $-17 + 31 + (-14) + 26$

Evaluate each expression if $x = 4$ and $y = -3$.

15. $11 + y$

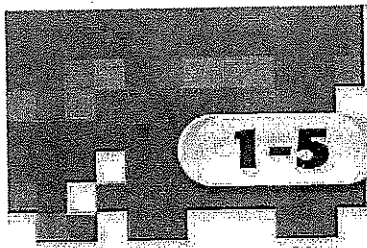
16. $x + (-6)$

17. $y + 2$

18. $|x + y|$

19. $|x| + y$

20. $x + |y|$

**1-5****Study Guide and Intervention*****Subtracting Integers***

To subtract an integer, add its opposite or additive inverse.

EXAMPLE 1 Find $8 - 15$.

$$\begin{array}{l} 8 - 15 = 8 + (-15) \quad \text{To subtract 15, add } -15. \\ = -7 \quad \text{Add.} \end{array}$$

EXAMPLE 2 Find $13 - (-22)$.

$$\begin{array}{l} 13 - (-22) = 13 + 22 \quad \text{To subtract } -22, \text{ add } 22. \\ = 35 \quad \text{Add.} \end{array}$$

EXERCISES**Subtract.**

1. $-3 - 4$

2. $5 - (-2)$

3. $-10 - 8$

4. $-15 - (-12)$

5. $-23 - (-28)$

6. $16 - 9$

7. $9 - 16$

8. $-21 - 16$

9. $28 - 37$

10. $-34 - (-46)$

11. $65 - (-6)$

12. $19 - |29|$

Evaluate each expression if $a = -7$, $b = -3$, and $c = 5$.

13. $a - 8$

14. $20 - b$

15. $a - c$

16. $c - b$

17. $b - a - c$

18. $c - b - a$

1-6**Study Guide and Intervention****Multiplying and Dividing Integers**

Use the following rules to determine whether the product or quotient of two integers is positive or negative.

- The product of two integers with different signs is negative.
- The product of two integers with the same sign is positive.
- The quotient of two integers with different signs is negative.
- The quotient of two integers with the same sign is positive.

EXAMPLE 1 Find $7(-4)$.

$7(-4) = -28$ The factors have different signs. The product is negative.

EXAMPLE 2 Find $-5(-6)$.

$-5(-6) = 30$ The factors have the same sign. The product is positive.

EXAMPLE 3 Find $15 \div (-3)$.

$15 \div (-3) = -5$ The dividend and divisor have different signs. The quotient is negative.

EXAMPLE 4 Find $-54 \div (-6)$.

$-54 \div (-6) = 9$ The dividend and divisor have the same sign. The quotient is positive.

EXERCISES

Multiply or divide.

1. $8(-8)$

2. $-3(-7)$

3. $-9(4)$

4. $12(8)$

5. $33 \div (-3)$

6. $-25 \div 5$

7. $48 \div 4$

8. $-63 \div (-7)$

9. $(-4)^2$

10. $\frac{-75}{15}$

11. $-6(3)(-5)$

12. $\frac{-143}{-13}$

Evaluate each expression if $a = -1$, $b = 4$, and $c = -7$.

13. $3c + b$

14. $a(b + c)$

15. $c^2 - 5b$

16. $\frac{a - 6}{c}$

2-3**Study Guide and Intervention**
Multiplying Rational Numbers

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

EXAMPLE 1 Find $\frac{3}{8} \cdot \frac{4}{11}$. Write in simplest form.

$$\frac{3}{8} \cdot \frac{4}{11} = \frac{3}{\cancel{8}^2} \cdot \frac{\cancel{4}^1}{11}$$

Divide 8 and 4 by their GCF, 4.

$$= \frac{3 \cdot 1}{2 \cdot 11}$$

Multiply the numerators and denominators.

$$= \frac{3}{22}$$

Simplify.

To multiply mixed numbers, first rewrite them as improper fractions.

EXAMPLE 2 Find $-2\frac{1}{3} \cdot 3\frac{3}{5}$. Write in simplest form.

$$-2\frac{1}{3} \cdot 3\frac{3}{5} = -\frac{7}{3} \cdot \frac{18}{5}$$

$$-2\frac{1}{3} = -\frac{7}{3}, 3\frac{3}{5} = \frac{18}{5}$$

$$= -\frac{7}{\cancel{3}^1} \cdot \frac{\cancel{18}^6}{5}$$

Divide 18 and 3 by their GCF, 3.

$$= -\frac{7 \cdot 6}{1 \cdot 5}$$

Multiply the numerators and denominators.

$$= -\frac{42}{5}$$

Simplify.

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

Write the result as a mixed number.

EXERCISES

Multiply. Write in simplest form.

1. $\frac{2}{3} \cdot \frac{3}{5}$

2. $\frac{4}{7} \cdot \frac{3}{4}$

3. $-\frac{1}{2} \cdot \frac{7}{9}$

4. $\frac{9}{10} \cdot \frac{2}{3}$

5. $\frac{5}{8} \cdot \left(-\frac{4}{9}\right)$

6. $-\frac{4}{7} \cdot \left(-\frac{2}{3}\right)$

7. $2\frac{2}{5} \cdot \frac{1}{6}$

8. $-3\frac{1}{3} \cdot 1\frac{1}{2}$

9. $3\frac{3}{7} \cdot 2\frac{5}{8}$

10. $-1\frac{7}{8} \cdot \left(-2\frac{2}{5}\right)$

11. $-1\frac{3}{4} \cdot 2\frac{1}{5}$

12. $2\frac{2}{3} \cdot 2\frac{3}{7}$

2-4**Study Guide and Intervention****Dividing Rational Numbers**

Two numbers whose product is 1 are **multiplicative inverses**, or **reciprocals**, of each other.

EXAMPLE 1 Write the multiplicative inverse of $-2\frac{3}{4}$.

$$-2\frac{3}{4} = -\frac{11}{4}$$

Write $-2\frac{3}{4}$ as an improper fraction.

Since $-\frac{11}{4} \left(-\frac{4}{11}\right) = 1$, the multiplicative inverse of $-2\frac{3}{4}$ is $-\frac{4}{11}$.

To divide by a fraction or mixed number, multiply by its multiplicative inverse.

EXAMPLE 2 Find $\frac{3}{8} \div \frac{6}{7}$. Write in simplest form.

$$\frac{3}{8} \div \frac{6}{7} = \frac{3}{8} \cdot \frac{7}{6}$$

Multiply by the multiplicative inverse of $\frac{6}{7}$, which is $\frac{7}{6}$.

$$= \frac{\overset{1}{\cancel{3}}}{8} \cdot \frac{7}{\underset{2}{\cancel{6}}}$$

Divide 6 and 3 by their GCF, 3.

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

Simplify.

EXERCISES

Write the multiplicative inverse of each number.

1. $\frac{3}{5}$

2. $-\frac{8}{9}$

3. $\frac{1}{10}$

4. $-\frac{1}{6}$

5. $2\frac{3}{5}$

6. $-1\frac{2}{3}$

7. $-5\frac{2}{5}$

8. $7\frac{1}{4}$

Divide. Write in simplest form.

9. $\frac{1}{3} \div \frac{1}{6}$

10. $\frac{2}{5} \div \frac{4}{7}$

11. $-\frac{5}{6} \div \frac{3}{4}$

12. $1\frac{1}{5} \div 2\frac{1}{4}$

13. $3\frac{1}{7} \div \left(-3\frac{2}{3}\right)$

14. $-\frac{4}{9} \div 2$

15. $\frac{6}{11} \div (-4)$

16. $5 \div 2\frac{1}{3}$

2-6**Study Guide and Intervention****Adding and Subtracting Unlike Fractions**

Fractions that have different denominators are called **unlike fractions**. To add or subtract unlike fractions, first rewrite the fractions with a common denominator. Then add or subtract and simplify, if necessary.

EXAMPLE 1 Find $\frac{3}{5} + \frac{2}{3}$. Write in simplest form.

$$\begin{aligned}\frac{3}{5} + \frac{2}{3} &= \frac{3}{5} \cdot \frac{3}{3} + \frac{2}{3} \cdot \frac{5}{5} \\ &= \frac{9}{15} + \frac{10}{15} \\ &= \frac{9+10}{15} \\ &= \frac{19}{15} \text{ or } 1\frac{4}{15}\end{aligned}$$

The LCD is $5 \cdot 3$ or 15.

Rename each fraction using the LCD.

Add the numerators. The denominators are the same.

Simplify.

EXAMPLE 2 Find $-3\frac{1}{2} - 1\frac{5}{6}$. Write in simplest form.

$$\begin{aligned}-3\frac{1}{2} - 1\frac{5}{6} &= -\frac{7}{2} - \frac{11}{6} \\ &= -\frac{7}{2} \cdot \frac{3}{3} - \frac{11}{6} \\ &= -\frac{21}{6} - \frac{11}{6} \\ &= \frac{-21-11}{6} \\ &= -\frac{32}{6} \text{ or } -\frac{16}{3} \text{ or } -5\frac{1}{3}\end{aligned}$$

Write the mixed numbers as improper fractions.

The LCD is $2 \cdot 3$ or 6.

Rename $\frac{7}{2}$ using the LCD.

Subtract the numerators.

Simplify.

EXERCISES

Add or subtract. Write in simplest form.

1. $\frac{2}{5} + \frac{3}{10}$

2. $\frac{1}{3} + \frac{2}{9}$

3. $\frac{5}{9} + \left(-\frac{1}{6}\right)$

4. $-\frac{3}{4} - \frac{5}{6}$

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

6. $1\frac{2}{3} - \left(-\frac{4}{9}\right)$

7. $-\frac{7}{10} - \left(-\frac{1}{2}\right)$

8. $2\frac{1}{4} + 1\frac{3}{8}$

9. $3\frac{3}{4} - 1\frac{1}{3}$

10. $-1\frac{1}{5} - 2\frac{1}{4}$

11. $-2\frac{4}{9} - \left(-1\frac{1}{3}\right)$

12. $3\frac{3}{5} - 2\frac{2}{3}$

1-8**Study Guide and Intervention****Solving Addition and Subtraction Equations**

You can use the following properties to solve addition and subtraction equations.

- *Addition Property of Equality* - If you add the same number to each side of an equation, the two sides remain equal.
- *Subtraction Property of Equality* - If you subtract the same number from each side of an equation, the two sides remain equal.

EXAMPLE 1 Solve $w + 19 = 45$. Check your solution.

$w + 19 = 45$	Write the equation.
$w + 19 - 19 = 45 - 19$	Subtract 19 from each side.
$w = 26$	$19 - 19 = 0$ and $45 - 19 = 26$. w is by itself.

Check	$w + 19 = 45$	Write the original equation.
	$26 + 19 \stackrel{?}{=} 45$	Replace w with 26. Is this sentence true?
	$45 = 45 \checkmark$	$26 + 19 = 45$

EXAMPLE 2 Solve $h - 25 = -76$. Check your solution.

$h - 25 = -76$	Write the equation.
$h - 25 + 25 = -76 + 25$	Add 25 to each side.
$h = -51$	$-25 + 25 = 0$ and $-76 + 25 = -51$. h is by itself.

Check	$h - 25 = -76$	Write the original equation.
	$-51 - 25 \stackrel{?}{=} -76$	Replace h with -51 . Is this sentence true?
	$-76 = -76 \checkmark$	$-51 - 25 = -51 + (-25)$ or -76

EXERCISES

Solve each equation. Check your solution.

1. $s - 4 = 12$

2. $d + 2 = 21$

3. $h + 6 = 15$

4. $x + 5 = -8$

5. $b - 10 = -34$

6. $f - 22 = -6$

7. $17 + c = 41$

8. $v - 36 = 25$

9. $y - 29 = -51$

10. $19 = z - 32$

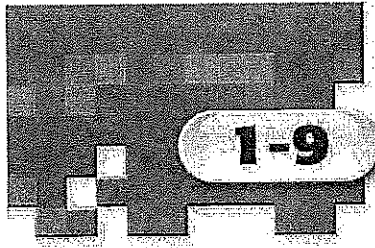
11. $13 + t = -29$

12. $55 = 39 + k$

13. $62 + b = 45$

14. $x - 39 = -65$

15. $-56 = -47 + n$

**1-9****Study Guide and Intervention****Solving Multiplication and Division Equations**

You can use the following properties to solve multiplication and division equations.

- *Multiplication Property of Equality* - If you multiply each side of an equation by the same number, the two sides remain equal.
- *Division Property of Equality* - If you divide each side of an equation by the same nonzero number, the two sides remain equal.

EXAMPLE 1 Solve $19w = 114$. Check your solution.

$$19w = 114 \quad \text{Write the equation.}$$

$$\frac{19w}{19} = \frac{114}{19} \quad \text{Divide each side of the equation by 19.}$$

$$1w = 6 \quad 19 \div 19 = 1 \text{ and } 114 \div 19 = 6.$$

$$w = 6 \quad \text{Identity Property; } 1w = w$$

Check $19w = 114$ Write the original equation.

$$19(6) \stackrel{?}{=} 114 \quad \text{Replace } w \text{ with } 6.$$

$$114 = 114 \checkmark \quad \text{This sentence is true.}$$

EXAMPLE 2 Solve $\frac{d}{15} = -9$. Check your solution.

$$\frac{d}{15} = -9$$

$$\frac{d}{15}(15) = -9(15) \quad \text{Multiply each side of the equation by 15.}$$

$$d = -135$$

Check $\frac{d}{15} = -9$ Write the original equation.

$$\frac{-135}{15} \stackrel{?}{=} -9 \quad \text{Replace } d \text{ with } -135.$$

$$-9 = -9 \checkmark \quad -135 \div 15 = -9$$

EXERCISES

Solve each equation. Check your solution.

- | | | |
|----------------------|-------------------------|-------------------------|
| 1. $\frac{r}{5} = 6$ | 2. $2d = 12$ | 3. $7h = -21$ |
| 4. $-8x = 40$ | 5. $\frac{f}{8} = -6$ | 6. $\frac{x}{-10} = -7$ |
| 7. $17c = -68$ | 8. $\frac{h}{-11} = 12$ | 9. $29t = -145$ |
| 10. $125 = 5z$ | 11. $13t = -182$ | 12. $117 = -39k$ |

2-7

NAME _____ DATE _____ PERIOD _____

Study Guide and Intervention

Solving Equations with Rational Numbers

The Addition, Subtraction, Multiplication, and Division Properties of Equality can be used to solve equations with rational numbers.

EXAMPLE 1 Solve $x - 2.73 = 1.31$. Check your solution.

$$x - 2.73 = 1.31 \quad \text{Write the equation.}$$

$$x - 2.73 + 2.73 = 1.31 + 2.73 \quad \text{Add 2.73 to each side.}$$

$$x = 4.04 \quad \text{Simplify.}$$

Check $x - 2.73 = 1.31$ Write the original equation.

$$4.04 - 2.73 \stackrel{?}{=} 1.31 \quad \text{Replace } x \text{ with } 4.04.$$

$$1.31 = 1.31 \checkmark \quad \text{Simplify.}$$

EXAMPLE 2 Solve $\frac{4}{5}y = \frac{2}{3}$. Check your solution.

$$\frac{4}{5}y = \frac{2}{3} \quad \text{Write the equation.}$$

$$\frac{5}{4} \left(\frac{4}{5}y \right) = \frac{5}{4} \cdot \frac{2}{3} \quad \text{Multiply each side by } \frac{5}{4}.$$

$$y = \frac{5}{6} \quad \text{Simplify.}$$

Check $\frac{4}{5}y = \frac{2}{3}$ Write the original equation.

$$\frac{4}{5} \left(\frac{5}{6} \right) \stackrel{?}{=} \frac{2}{3} \quad \text{Replace } y \text{ with } \frac{5}{6}.$$

$$\frac{2}{3} = \frac{2}{3} \checkmark \quad \text{Simplify.}$$

EXERCISES

Solve each equation. Check your solution.

1. $t + 1.32 = 3.48$

2. $b - 4.22 = 7.08$

3. $-8.07 = r - 4.48$

4. $h + \frac{4}{9} = \frac{7}{9}$

5. $-\frac{5}{8} = x - \frac{1}{4}$

6. $-\frac{2}{3} + f = \frac{3}{5}$

7. $3.2c = 9.6$

8. $-5.04 = 1.26d$

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

10. $-\frac{2}{3} = \frac{3}{4}t$

11. $\frac{w}{2.5} = 4.2$

12. $1\frac{3}{4}r = 3\frac{5}{8}$

4-4**Study Guide and Intervention****Solving Proportions**

A **proportion** is an equation that states that two ratios are equivalent. To determine whether a pair of ratios forms a proportion, use cross products. You can also use cross products to solve proportions.

EXAMPLE 1 Determine whether the pair of ratios $\frac{20}{24}$ and $\frac{12}{18}$ forms a proportion.

Find the cross products.

$$\begin{array}{l} \frac{20}{24} \cdot \frac{12}{18} \rightarrow 24 \cdot 12 = 288 \\ \frac{24}{18} \cdot \frac{12}{20} \rightarrow 20 \cdot 18 = 360 \end{array}$$

Since the cross products are not equal, the ratios do not form a proportion.

EXAMPLE 2 Solve $\frac{12}{30} = \frac{k}{70}$.

$$\frac{12}{30} = \frac{k}{70}$$

Write the equation.

$$12 \cdot 70 = 30 \cdot k$$

Find the cross products.

$$840 = 30k$$

Multiply.

$$\frac{840}{30} = \frac{30k}{30}$$

Divide each side by 30.

$$28 = k$$

Simplify.

The solution is 28.

EXERCISES

Determine whether each pair of ratios forms a proportion.

1. $\frac{17}{10}, \frac{12}{5}$

2. $\frac{6}{9}, \frac{12}{18}$

3. $\frac{8}{12}, \frac{10}{15}$

4. $\frac{7}{15}, \frac{13}{32}$

5. $\frac{7}{9}, \frac{49}{63}$

6. $\frac{8}{24}, \frac{12}{28}$

7. $\frac{4}{7}, \frac{12}{71}$

8. $\frac{20}{35}, \frac{30}{45}$

9. $\frac{18}{24}, \frac{3}{4}$

Solve each proportion.

10. $\frac{x}{5} = \frac{15}{25}$

11. $\frac{3}{4} = \frac{12}{c}$

12. $\frac{6}{9} = \frac{10}{r}$

13. $\frac{16}{24} = \frac{z}{15}$

14. $\frac{5}{8} = \frac{s}{12}$

15. $\frac{14}{t} = \frac{10}{11}$

16. $\frac{w}{6} = \frac{2.8}{7}$

17. $\frac{5}{y} = \frac{7}{16.8}$

18. $\frac{x}{18} = \frac{7}{36}$

5-2

Study Guide and Intervention

Fractions, Decimals, and Percents

- To write a percent as a decimal, divide by 100 and remove the percent symbol.
- To write a decimal as a percent, multiply by 100 and add the percent symbol.
- To express a fraction as a percent, you can use a proportion. Alternatively, you can write the fraction as a decimal, and then express the decimal as a percent.

EXAMPLE 1 Write 56% as a decimal.

$$56\% = \frac{56}{100} \text{ Divide by 100 and remove the percent symbol.}$$

$$= 0.56$$

EXAMPLE 2 Write 0.17 as a percent.

$$0.17 = \frac{17}{100} \text{ Multiply by 100 and add the percent symbol.}$$

$$= 17\%$$

EXAMPLE 3 Write $\frac{7}{20}$ as a percent.

Method 1 Use a proportion.

$$\frac{7}{20} = \frac{x}{100} \text{ Write the proportion.}$$

$$7 \cdot 100 = 20 \cdot x \text{ Find cross products.}$$

$$700 = 20x \text{ Multiply.}$$

$$\frac{700}{20} = \frac{20x}{20} \text{ Divide each side by 20.}$$

$$35 = x \text{ Simplify.}$$

Method 2 Write as a decimal.

$$\frac{7}{20} = 0.35 \text{ Convert to a decimal by dividing.}$$

$$= 35\% \text{ Multiply by 100 and add the percent symbol.}$$

So, $\frac{7}{20}$ can be written as 35%.

EXERCISES

Write each percent as a decimal.

1. 10% 2. 36% 3. 82% 4. 49.1%

Write each decimal as a percent.

5. 0.14 6. 0.59 7. 0.932 8. 1.07

Write each fraction as a percent.

9. $\frac{3}{4}$ 10. $\frac{7}{10}$ 11. $\frac{9}{16}$ 12. $\frac{1}{40}$

7-1

Study Guide and Intervention

Area of Parallelograms, Triangles, and Trapezoids

The area A of a parallelogram is the product of any base b and its height h , or $A = bh$.

The area A of a triangle is half the product of any base b and its height h , or $A = \frac{1}{2}bh$.

The area A of a trapezoid is half the product of the height h and the sum of the bases, b_1 and b_2 , or $A = \frac{1}{2}h(b_1 + b_2)$.

EXAMPLES Find the area of each figure.

- 1 The base is 8 yards. The height is 6 yards.

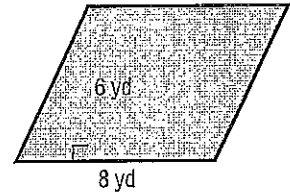
$A = bh$

$A = 8 \cdot 6$ or 48

The area is 48 square yards.

Area of a parallelogram

Replace b with 8 and h with 6. Multiply.



- 2 The base is 10 feet. The height is 4 feet.

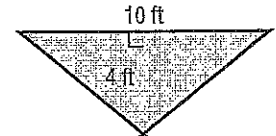
$A = \frac{1}{2}bh$

$A = \frac{1}{2} \cdot 10 \cdot 4$ or 20

The area is 20 square feet.

Area of a triangle

Replace b with 10 and h with 4. Multiply.



- 3 The height is 5 inches. The lengths of the bases are 9 inches and 7 inches.

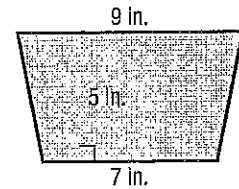
$A = \frac{1}{2}h(b_1 + b_2)$

$A = \frac{1}{2} \cdot 5 \cdot (9 + 7)$ or 40

The area is 40 square inches.

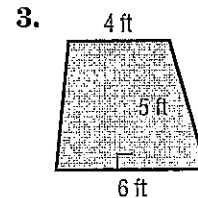
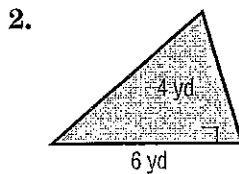
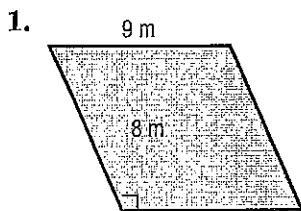
Area of a trapezoid

Replace h with 5, b_1 with 9, and b_2 with 7. Simplify.



EXERCISES

Find the area of each figure.



4. parallelogram: base, 11 cm; height, 12 cm

5. triangle: base, 8 mi; height, 13 mi

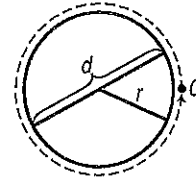
6. trapezoid: height, 7 km; bases, 8 km and 12 km

7-2

Study Guide and Intervention
Circumference and Area of Circles

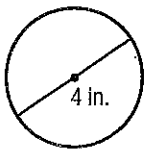
The **circumference** C of a circle is equal to its diameter d times π or 2 times the radius r times π , or $C = \pi d$ or $C = 2\pi r$.

The **area** A of a circle is equal to π times the square of the radius r , or $A = \pi r^2$.



EXAMPLES Find the circumference of each circle.

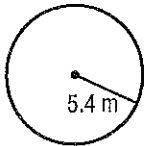
1



$C = \pi d$ Circumference of a circle
 $C = \pi \cdot 4$ Replace d with 4.
 $C \approx 12.6$ Use a calculator.

The circumference is about 12.6 inches.

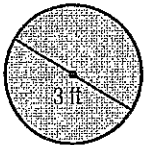
2



$C = 2\pi r$ Circumference of a circle
 $C = 2 \cdot \pi \cdot 5.4$ Replace r with 5.4.
 $C \approx 33.9$ Use a calculator.

The circumference is about 33.9 meters.

EXAMPLE 3 Find the area of the circle.



$A = \pi r^2$ Area of a circle
 $A = \pi(1.5)^2$ Replace r with half of 3 or 1.5.
 $A \approx 7.1$ Use a calculator.

The area is about 7.1 square feet.

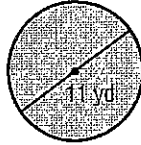
EXERCISES

Find the circumference and area of each circle. Round to the nearest tenth.

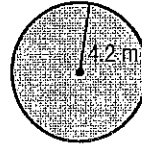
1.



2.



3.



4. The diameter is 9.3 meters.
5. The radius is 6.9 millimeter.
6. The diameter is 15.7 inches.

3-3

Study Guide and Intervention

The Coordinate Plane

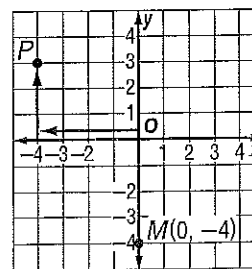
The **coordinate plane** is used to locate points. The horizontal number line is the **x-axis**. The vertical number line is the **y-axis**. Their intersection is the **origin**.

Points are located using **ordered pairs**. The first number in an ordered pair is the **x-coordinate**; the second number is the **y-coordinate**.

The coordinate plane is separated into four sections called **quadrants**.

EXAMPLE 1 Name the ordered pair for point P. Then identify the quadrant in which P lies.

- Start at the origin.
 - Move 4 units left along the x-axis.
 - Move 3 units up on the y-axis.
- The ordered pair for point P is $(-4, 3)$.
P is in the upper left quadrant or quadrant II.



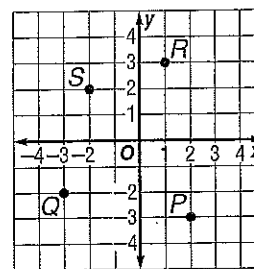
EXAMPLE 2 Graph and label the point $M(0, -4)$.

- Start at the origin.
- Move 0 units along the x-axis.
- Move 4 units down on the y-axis.
- Draw a dot and label it $M(0, -4)$.

EXERCISES

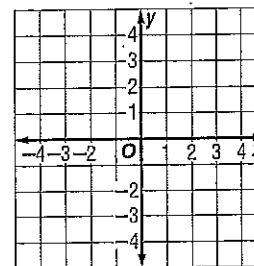
Name the ordered pair for each point graphed at the right. Then identify the quadrant in which each point lies.

- | | |
|------|------|
| 1. P | 2. Q |
| 3. R | 4. S |



Graph and label each point on the coordinate plane.

- | | |
|---------------|----------------|
| 5. $A(-1, 1)$ | 6. $B(0, -3)$ |
| 7. $C(3, 2)$ | 8. $D(-3, -1)$ |
| 9. $E(1, -2)$ | 10. $F(1, 3)$ |



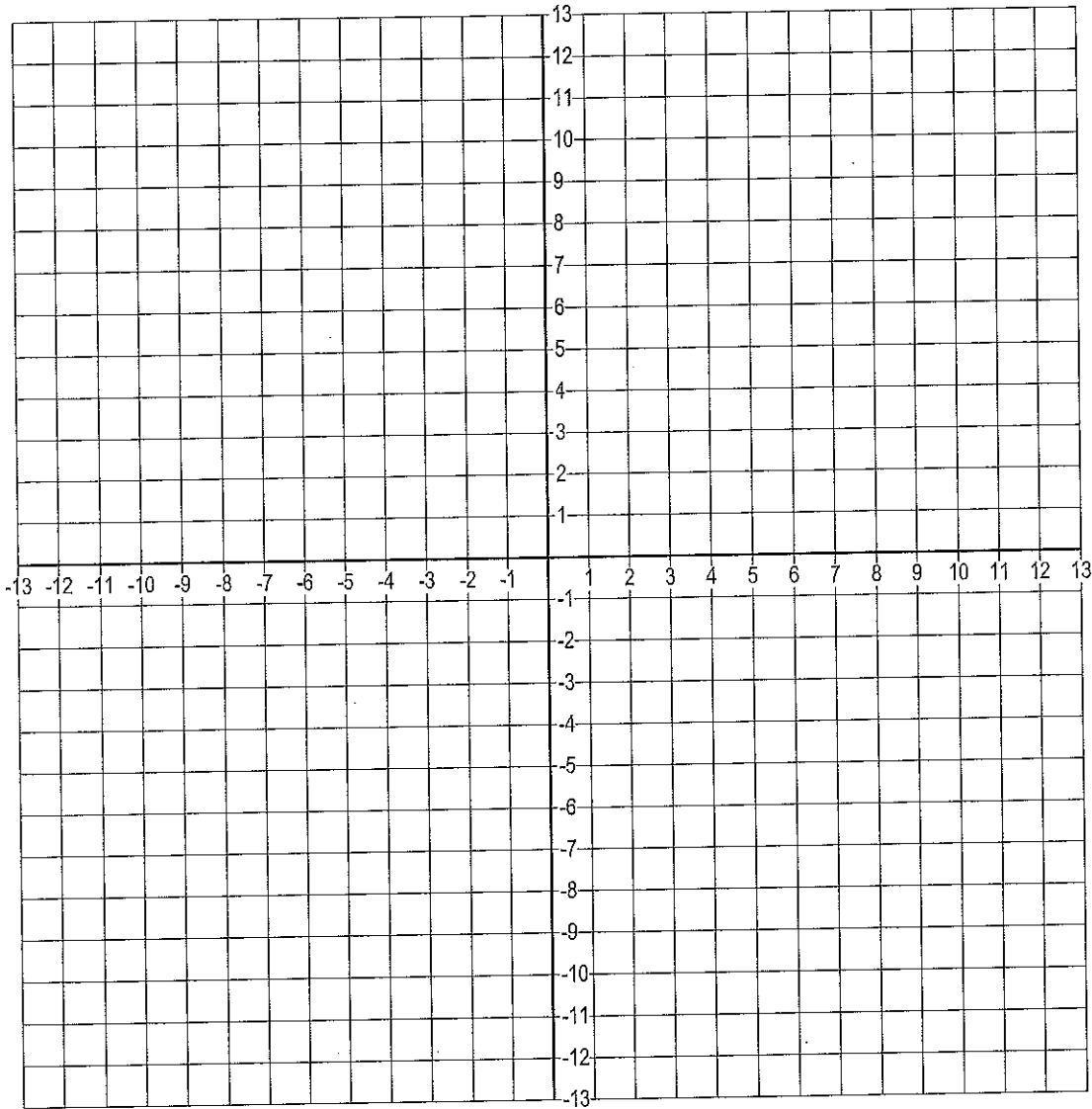
Lesson 3-3

Plotting a Hidden Message

Name: _____ Date: _____



Connect each series of points to reveal a hidden message.



(-12, 4) (-12, 0) (6, -5) (4, -5) (4, -1) (6, -1) (-3, 0) (-5, 0) (-5, 4) (-3, 4) (-6, 5) (-8, 5) (-8, 9) (-6, 9)
 (10, 2) (12, 2) (3, -8) (5, -8) (4, -3) (5, -3) (0, -6) (2, -6) (-2, 4) (0, 4) (4, 0) (4, 4) (-2, 0) (0, 0)
 (-6, -10) (-6, -6) (-5, -9) (-4, -6) (-4, -10) (-6, -1) (-8, -2) (-8, -4) (-6, -5) (-6, -3) (-7, -3) (7, 7) (8, 7)
 (-5, -5) (-5, -1) (-3, -1) (-3, -3) (-5, -3) (-11, 9) (-11, 5) (-10, 7) (-9, 5) (-9, 9) (9, 5) (7, 5) (7, 9) (9, 9)
 (1, 5) (1, 9) (3, 9) (3, 5) (1, 5) (3, 4) (1, 3) (1, 1) (3, 0) (3, 2) (2, 2) (4, 5) (4, 9) (5, 6) (6, 9) (6, 5)
 (-8, 7) (-7, 7) (-5, 9) (-5, 5) (-3, 5) (1, -6) (1, -10) (-3, -8) (-1, -8) (-4, -3) (-3, -5) (-2, -3) (0, -3)
 (-13, 4) (-11, 4) (1, -5) (1, -1) (2, -1) (3, -3) (2, -5) (1, -5) (-3, -10) (-3, -8) (-2, -6) (-1, -8) (-1, -10)
 (5, -10) (5, -6) (12, 0) (12, 4) (10, 0) (10, 4) (-1, 0) (-1, 4) (3, -10) (3, -6) (-5, 2) (-4, 2)
 (-2, -5) (-2, -3) (-1, -1) (0, -3) (0, -5) (0, 5) (-2, 5) (-2, 9) (0, 9) (-10, 0) (-10, 4) (-8, 4) (-8, 0) (-10, 0)
 (8, 4) (8, 0) (4, 2) (6, 2) (7, 4) (9, 4) (6, 0) (6, 4)

Summer Review Packet Answers:

Rounding Decimals:

- 1) 42 2) 120 3) 20 4) 3 5) 80 6) 8 7) 29
8) 110 9) 33.3 10) 1.9 11) 100.0 12) 103.1 13) 16.0
14) 281.1 15) 8.7 16) 27.8 17) 69.71 18) 5.57 19) 609.91
20) 247.90 21) 5.54 22) 67.20 23) 14.03 24) 6.94

Multiplying & Dividing by 10, 100, etc.

- 1) 481 2) 3.768 3) 460 4) 0.000712 5) 54 6) 27.5
7) 439,500 8) 0.000075 9) 22.74 10) 900 11) 0.618
12) 0.039006 13) 1,600 14) 0.0028889 15) 368,900
16) 0.00091 17) 3,360 18) 0.01672

1-2 Powers and Exponents

- 1) $7 \cdot 7 \cdot 7$ 2) $2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2$ 3) $9 \cdot 9$ 4) $15 \cdot 15 \cdot 15 \cdot 15$
5) 243 6) 343 7) 4,096 8) 125 9) 2^4 10) 7^6
11) 10^3 12) 12^5 13) 12^3 14) 5^4 15) 6^5 16) 1^8

1-3 Order of Operations

- 1) 24 2) 0 3) 17 4) 3 5) 10 6) 3,000
7) 18 8) 5 9) 9 10) 24 11) 17 12) 350

1-4 Adding Integers

- 1) 25 2) -20 3) -8 4) -38 5) -10 6) 1 7) 26
8) -100 9) -38 10) 9 11) 1 12) -33 13) -12 14) 26
15) 8 16) -2 17) -1 18) 1 19) 1 20) 7

1-5 Subtracting Integers

1-5 Subtracting Integers

- 1) -7 2) 7 3) -18 4) -3 5) 5 6) 7 7) -7
8) -37 9) -9 10) 12 11) 71 12) -10 13) -15 14) 23
15) -12 16) 8 17) -1 18) 15

1-6 Multiplying and Dividing Integers

- 1) -64 2) 21 3) -36 4) 96 5) -11 6) -5 7) 12
8) 9 9) 16 10) -5 11) 90 12) 11 13) -17 14) 3
15) 29 16) 1

2-3 Multiplying Rational Numbers

- 1) $\frac{2}{5}$ 2) $\frac{3}{7}$ 3) $-\frac{7}{18}$ 4) $\frac{3}{5}$ 5) $-\frac{5}{18}$ 6) $\frac{8}{21}$
7) $\frac{2}{5}$ 8) -5 9) 9 10) $4\frac{1}{2}$ 11) $-3\frac{17}{20}$ 12) $6\frac{10}{21}$

2-4 Dividing Rational Numbers

- 1) $\frac{5}{3}$ 2) $-\frac{9}{8}$ 3) 10 4) -6 5) $\frac{5}{13}$ 6) $-\frac{3}{5}$
7) $-\frac{5}{27}$ 8) $\frac{4}{29}$ 9) 2 10) $\frac{7}{10}$ 11) $-1\frac{1}{9}$ 12) $\frac{8}{15}$
13) $-\frac{6}{7}$ 14) $-\frac{2}{9}$ 15) $-\frac{3}{22}$ 16) $2\frac{1}{7}$

2-6 Adding and Subtracting Unlike Fractions

- 1) $\frac{7}{10}$ 2) $\frac{5}{9}$ 3) $\frac{7}{18}$ 4) $-1\frac{7}{12}$ 5) $1\frac{2}{15}$ 6) $2\frac{1}{9}$
7) $-\frac{1}{5}$ 8) $3\frac{5}{8}$ 9) $2\frac{5}{12}$ 10) $-3\frac{9}{20}$ 11) $-1\frac{1}{9}$ 12) $\frac{14}{15}$

1-8 Solving Addition and Subtraction Equations

- 1) $s = 16$ 2) $d = 19$ 3) $h = 9$ 4) $x = -13$ 5) $b = -24$ 6) $f = 16$
7) $c = 24$ 8) $v = 61$ 9) $y = -22$ 10) $z = 51$ 11) $t = -42$ 12) $k = 16$
13) $b = -17$ 14) $x = -26$ 15) $n = -9$

1-9 Solving Multiplication and Division Equations

- 1) $r = 30$ 2) $d = 6$ 3) $h = -3$ 4) $x = -5$ 5) $f = -48$ 6) $x = 70$
7) $c = -4$ 8) $h = -132$ 9) $t = -5$ 10) $z = 25$ 11) $t = -14$ 12) $k = -3$

2-7 Solving Equations with Rational Numbers

- 1) $t = 2.16$ 2) $b = 11.3$ 3) $r = -3.59$ 4) $h = \frac{1}{3}$ 5) $x = -\frac{3}{8}$ 6) $f = 1\frac{14}{15}$
7) $c = 3$ 8) $d = -4$ 9) $x = 10$ 10) $t = -\frac{8}{9}$ 11) $w = 10.5$ 12) $r = 2\frac{1}{14}$

4-4 Solving Proportions

- 1) no 2) yes 3) yes 4) no 5) yes 6) no
7) no 8) no 9) yes 10) $x = 3$ 11) $c = 16$ 12) $r = 15$
13) $z = 10$ 14) $s = 7.5$ 15) $t = 15.4$ 16) $w = 2.4$ 17) $y = 12$ 18) $x = 3.5$

5-2 Fractions, Decimals, and Percents

- 1) 0.10 2) 0.36 3) 0.82 4) 0.491 5) 14% 6) 59%
7) 93.2% 8) 107% 9) 75% 10) 70% 11) 56.25% 12) 2.5%

7-1 Area of Parallelograms, Triangles, and Trapezoids

- 1) 72 sq. meters 2) 12 sq. yards 3) 25 sq. feet
4) 132 sq. centimeters 5) 52 sq. centimeters 6) 70 sq. kilometers

7-2 Circumference and Area of Circles

- 1) $C = 6.3\text{cm}$; $A = 3.1\text{ sq. cm}$ 2) $C = 34.6\text{ yd}$; $A = 95.0\text{ sq. yd}$
3) $C = 26.4\text{ m}$; $A = 55.4\text{ sq. m}$ 4) $C = 29.2\text{ m}$; $A = 67.9\text{ sq. m}$
5) $C = 43.3\text{ mm}$; $A = 149.6\text{ sq. mm}$ 6) $C = 49.3\text{ in}$; $A = 193.6\text{ sq. in}$

