REVIEW: Comparing, Ordering, and Graphing Integers

Name _____

Key Concept and Vocabulary

zero

$\ldots, -3, -2, -1, 0, 1, 2, 3, \ldots$ (Integers)

negative integers   positive integers

Visual Model

Number Line

$-4 < 2$ because -4 is to the left of 2 on the number line.
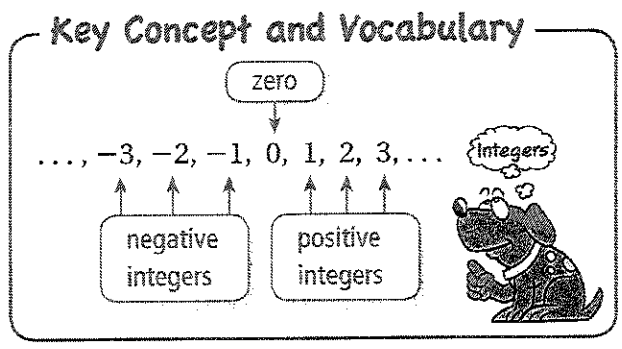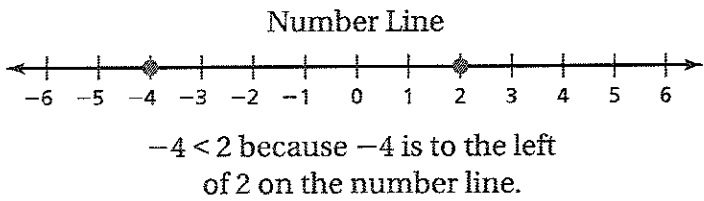
Skill Examples

1. $0 \leq 4$ "0 is less than or equal to 4"

2. $-1 > -3$ "-1 is greater than -3"

3. $-2 < -1$ "-2 is less than -1"

4. $2 > -2$ "2 is greater than -2"

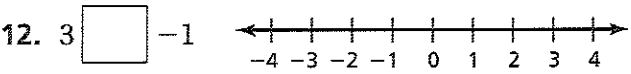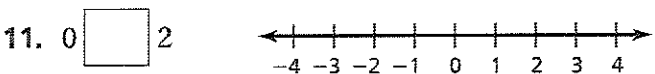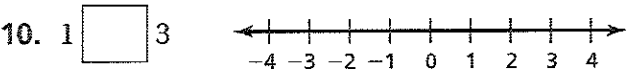5. $3 \geq 2$ "3 is greater than or equal to 2"
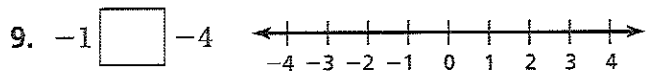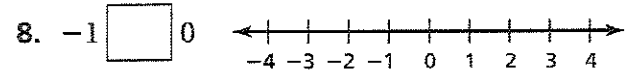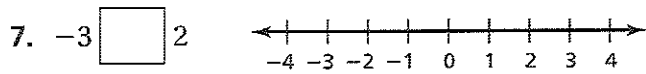
Application Example

6. The temperature in Seattle is 4°F. The temperature in Denver is -6°F. Which temperature is greater?

   $-6 < 4$ "-6 is less than 4"

   ∴ The temperature is greater in Seattle.

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Check your answers at BigIdeasMath.com.

Graph the two numbers. Then compare them using < or >.

7. -3 ☐ 2

8. -1 ☐ 0

9. -1 ☐ -4

10. 1 ☐ 3

11. 0 ☐ 2

12. 3 ☐ -1

Order the temperatures from least to greatest.
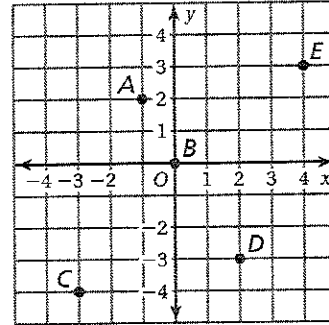
13. -5°F, 13°F, 0°F, 5°F, 2°F, 20°F

_____

14. 7°C, -4°C, -11°C, 0°C, 8°C, -12°C

_____

Use an integer to describe the real-life situation.

15. A *profit* of \$5 _____

    A *loss* of \$5 _____

16. A *depth* of 8 ft _____

    A *height* of 4 ft _____

17. A *decrease* of 5°F _____

    An *increase* of 8°F _____

18. **BUSINESS LOSS** During its first week, a business had a loss that was greater than \$4, but less than \$6. Circle each integer that could represent this loss.

    $-\$7,$ $-\$6,$ $-\$5,$ $-\$4,$ $-\$3,$ $-\$2,$ $-\$1,$ \$0,   \$1,   \$2,   \$3,   \$4,   \$5,   \$6,   \$7

REVIEW: Coordinate Plane

Name _____

Key Concept and Vocabulary

ordered pair

(x, y)
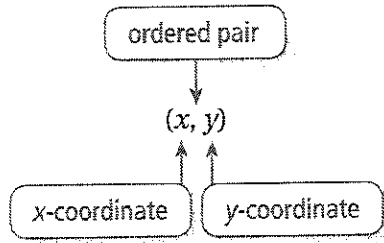
x-coordinate   y-coordinate

Skill Examples

1. $A(-1, 2)$ (Quadrant II)
2. $B(0, 0)$ (origin)
3. $C(-3, -4)$ (Quadrant III)
4. $D(2, -3)$ (Quadrant IV)
5. $E(4, 3)$ (Quadrant I)

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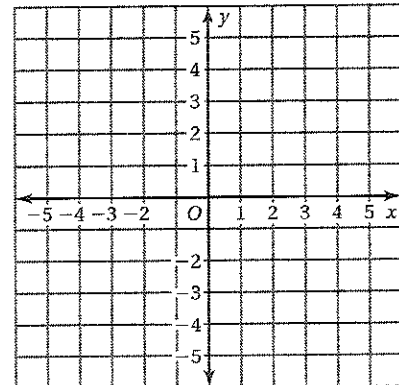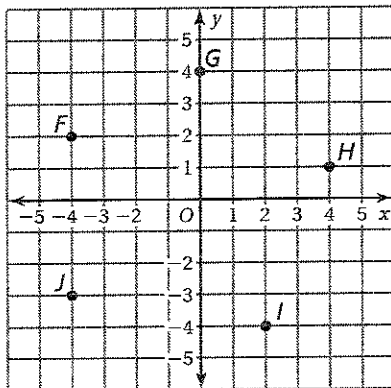*Check your answers at BigIdeasMath.com.*

Write the ordered pair that represents the point in the coordinate plane.

6. F _____

7. G _____

8. H _____

9. I _____

10. J _____

Plot the ordered pair in the coordinate plane. Name the quadrant for the point.
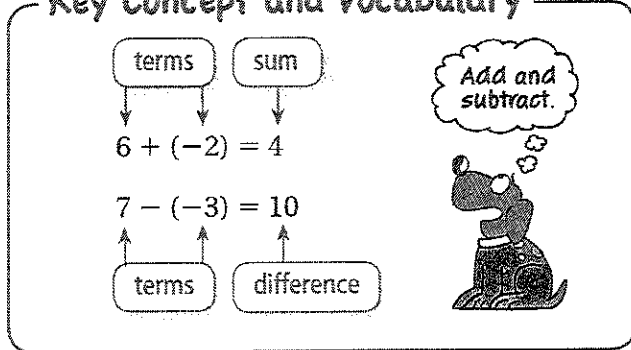
11. $K(-3, 5)$ _____

12. $L(-3, 0)$ _____

13. $M(2, 5)$ _____

14. $N(4, -2)$ _____

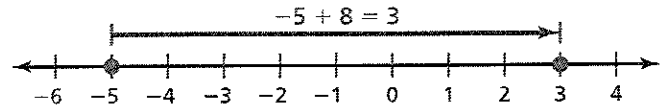15. $P(-2, -4)$ _____

REVIEW: Adding and Subtracting Integers

Key Concept and Vocabulary

terms   sum

$6 + (-2) = 4$

$7 - (-3) = 10$

terms   difference

Add and subtract.

Visual Model

To add a positive number, move to the *right*.

$$-5 + 8 = 3$$

-6 -5 -4 -3 -2 -1 0 1 2 3 4

To subtract a positive number, move to the *left*.

Skill Examples

1. $5 + (-3) = 5 - 3 = 2$

2. $5 - (-2) = 5 + 2 = 7$

3. $-2 + 4 = 2$

4. $-3 - (-2) = -3 + 2 = -1$

5. $8 - (-3) = 8 + 3 = 11$

To subtract, change the sign and add.

Application Example

6. The temperature is 8°F in the morning and drops to −5°F in the evening. What is the difference between these temperatures?

$$8 - (-5) = 8 + 5$$
$$= 13$$

The difference is 13 degrees.

PRACTICE MAKES PURR-FECT™

Check your answers at BigIdeasMath.com.

Find the sum or difference.

7. $-2 + 3 = $ ____

8. $-4 - 5 = $ ____

9. $8 - 2 = $ ____

10. $8 - (-2) = $ ____

11. $-4 - (-1) = $ ____

12. $-5 + (-5) = $ ____

13. $4 - (-8) = $ ____

14. $4 - 8 = $ ____
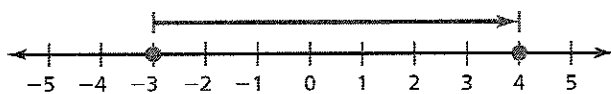
15. $-4 + (-6) = $ ____

16. $-4 - (-6) = $ ____

17. $10 - 13 = $ ____

18. $13 - (-10) = $ ____

Write the addition or subtraction shown by the number line.

19.

-5 -4 -3 -2 -1 0 1 2 3 4 5

20.

-5 -4 -3 -2 -1 0 1 2 3 4 5
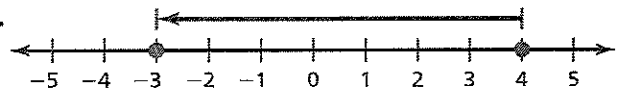
21. **TEMPERATURE** The temperature is 16°F in the morning and drops to −15°F in the evening. What is the difference between these temperatures? _____

22. **SUBMARINE** A submarine is 450 feet below sea level. It descends 300 feet. What is its new position? Show your work.

_____

_____

REVIEW: Multiplying and Dividing Integers

Name _____

Key Concept and Vocabulary

factors   product

$$8 \cdot (-5) = -40$$

$$-12 \div (-3) = 4$$

dividend   divisor   quotient

Multiply and divide.

Visual Model

$$4 \cdot (-2) = (-2) + (-2) + (-2) + (-2)$$

-9 -8 -7 -6 -5 -4 -3 -2 -1 0 1

Skill Examples

1. $-3 \cdot (-4) = 12$ ← same sign, product and quotient positive

2. $-36 \div (-6) = 6$ ←

3. $-7 \cdot 0 = 0$

4. $-10 \div 5 = -2$ ← different signs, product and quotient negative

5. $-5 \cdot 6 = -30$ ←

Application Example

6. Each of your six friends owes you $5. Use integer multiplication to represent the total amount your friends owe you.

$$6 \cdot (-5) = -30$$

∴ The total amount owed is $30.

PRACTICE MAKES PURR-FECT™

Check your answers at BigIdeasMath.com.

Find the product or quotient.

7. $-3 \times (-5) =$ _____

8. $7(-3) =$ _____

9. $0 \cdot (-5) =$ _____

10. $(-5)(-7) =$ _____

11. $-8 \cdot 2 =$ _____

12. $(-5)^2 =$ _____

13. $(-3)^3 =$ _____
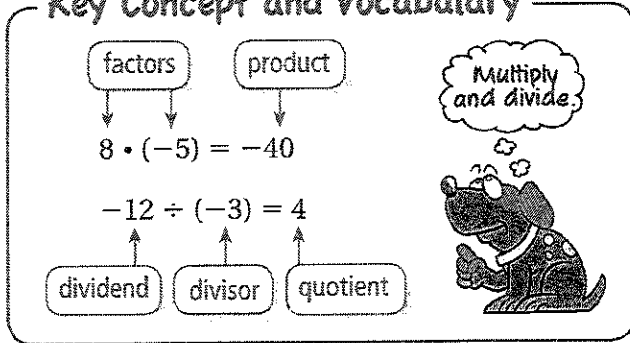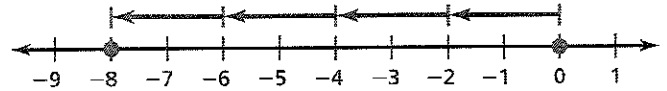
14. $4(-2)(-3) =$ _____

15. $-16 \div 4 =$ _____

16. $-20 \div (-5) =$ _____

17. $\dfrac{-9}{3} =$ _____

18. $\dfrac{-20}{-10} =$ _____

Complete the multiplication or division equation.

19. $-15 \div$ _____ $= -3$

20. $45 \div$ _____ $= -5$

21. _____ $\div (-20) = 5$

22. $8 \cdot$ _____ $= -64$

23. _____ $\cdot (-9) = 27$

24. $-12 \cdot$ _____ $= -96$

25. **TOTAL OWED** Each of your eight friends owes you $10. Use integer multiplication to represent the total amount your friends owe you. _____

_____

26. **TEMPERATURE** The low temperatures for a week in Edmonton, Alberta are $-15°C$, $-12°C$, $-10°C$, $-12°C$, $-18°C$, $-20°C$, and $-25°C$. What is the mean low temperature for the week? Show your work.

_____

_____

REVIEW: Evaluating Expressions

Name _____

Key Concept and Vocabulary

variable

Evaluating Expressions

Expression: $2x^2 + 3x - 6$

Evaluate when $x = 2$.

$2(2^2) + 3(2) - 6 = 8 + 6 - 6$
$\qquad\qquad\qquad = 8$

Visual Model

x	$2x + 3$	Value of Expression
1	$2(1) + 3$	5
2	$2(2) + 3$	7
3	$2(3) + 3$	9
4	$2(4) + 3$	11

Skill Examples

1. When $x = 5$, $3x + 4$ is $3(5) + 4 = 19$.

2. When $x = -1$, $5x + 7$ is $5(-1) + 7 = 2$.

3. When $x = 3$, $4x^2$ is $4(3^2) = 36$.

4. When $x = 4$, $x^3 + 1$ is $4^3 + 1 = 65$.

Application Example

5. For a Celsius temperature C the Fahrenheit temperature F is $\frac{9}{5}C + 32$. Find F when $C = 25°$.

$$\frac{9}{5}C + 32 = \frac{9}{5}(25) + 32$$
$$= 45 + 32$$
$$= 77$$

∴ The Fahrenheit temperature is $77°$.
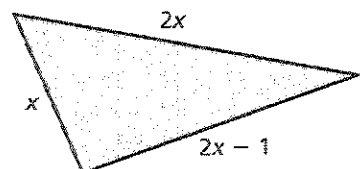
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*Check your answers at BigIdeasMath.com.*

Evaluate the expression.

6. When $x = 2$, $3x - 1 =$ _____.

7. When $x = -1$, $3x + 9 =$ _____.

8. When $x = 4$, $x^2 - 5 =$ _____.

9. When $x = \frac{1}{2}$, $3x^2 =$ _____.

10. When $x = 3.1$, $5x + 0.5 =$ _____.

11. When $x = 0$, $4x^2 + 5 =$ _____.

12. When $x = 10$, $x^2 - 8x + 11 =$ _____.

13. When $x = 2\frac{1}{2}$, $6x + 3 =$ _____.

Evaluate the perimeter when $x = 3$.

14. $P =$ _____

$2x$

x

$2x - 1$

15. $P =$ _____

$x + 1$

$2x - 1$

$3x - 1$

16. **CARDINAL** The weight of the cardinal (in ounces) is $0.6x + 11$ after its eats x ounces of bird seed. How much does it weigh after it eats 2 ounces of bird seed? _____

Topic 17.1
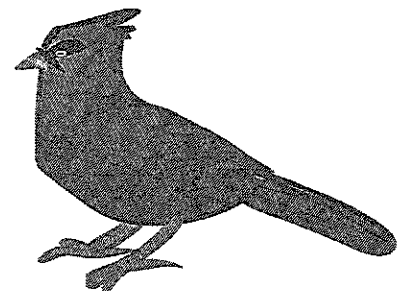
REVIEW: Writing Expressions and Equations

Key Concept and Vocabulary
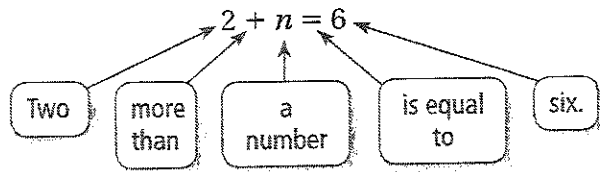
Phrase: Two more than a number

Expression: $2 + n$

Sentence: Two more than a number is equal to six.

Equation: $2 + n = 6$

Writing Expressions

Visual Model

$$2 + n = 6$$

Two | more than | a number | is equal to | six.

Skill Examples

1. Five times a number: $5n$

2. Six less than three times a number: $3n - 6$

3. The sum of a number and one: $n + 1$

4. A number divided by three: $n \div 3$

Application Example

5. Write an equation for the following.
   "The price of $15 is the wholesale cost plus a markup of fifty percent."

   Let C be the wholesale cost.
   50% of C is $0.5C$.

   ∴ An equation is $15 = C + 0.5C$.
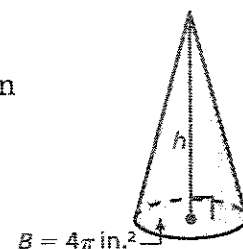
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Check your answers at BigIdeasMath.com.

Write the verbal phrase as a mathematical expression.

6. The product of a number and two

7. 10 subtracted from a number

8. 19 less than twice a number

9. The sum of a number and three, divided by four

10. Five times the sum of a number and two

11. Seven less than four times a number

Write the sentence as an equation.

12. Three times a number equals nine.

13. The difference of a number and nine is four.

14. Twelve divided by a number is four.

15. The sum of a number and seven is eighteen.

16. The volume of a cone is one-third the area of the base times the height. A cone has a volume of 20π cubic inches. Write an equation that can be used to solve for the height of the cone.
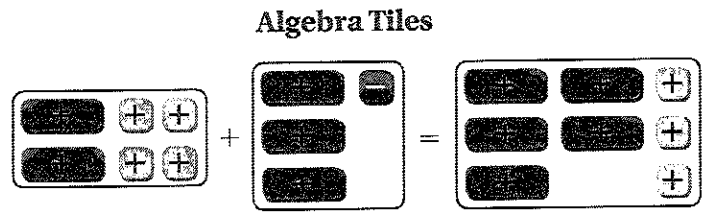
$B = 4\pi$ in.²

Topic 17.2

REVIEW: Simplifying Expressions

Name _____

Key Concept and Vocabulary

Combine variable terms.

$2x + 4 + 3x - 1 = 5x + 3$

Combine numerical terms.

Simplifying Expressions

Visual Model

Algebra Tiles
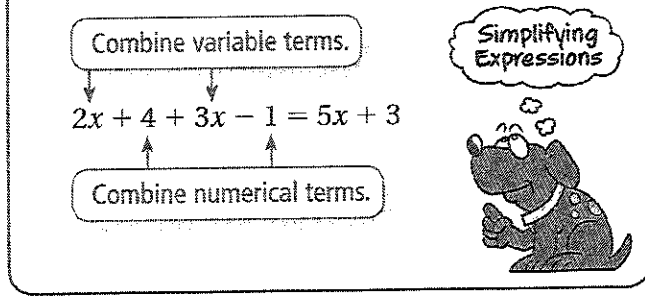
Skill Examples

1. $2x + 5x = 7x$

2. $1 + n + 4 = n + 5$

3. $(2x + 3) - (x + 2) = x + 1$

4. $2(y - 1) + 3(y + 2) = 5y + 4$

Application Example

5. The original cost of a shirt is x dollars. The shirt is on sale for 30% off. Write a simplifed expression for the sale cost.

30% Off

$$x - 0.3x = 0.7x$$
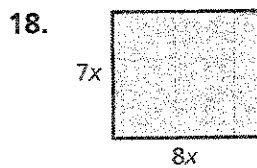
∴ The sale cost is $0.7x$.

PRACTICE MAKES PURR-FECT™
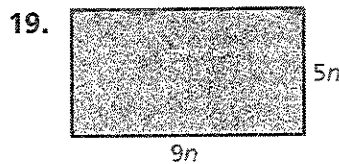
Check your answers at BigIdeasMath.com.

Simplify the expression. *(Remove parentheses and combine like terms.)*

6. $4x + 6x = $ _____

7. $3n + 5 - 2n = $ _____

8. $9x + 3 - 6x - 2 = $ _____

9. $3(x + 2) = $ _____

10. $7m - 2m + 5m = $ _____

11. $2 - (x + 1) = $ _____

12. $(3x + 6) - x = $ _____

13. $5 - (1 - n) = $ _____

14. $(x + 6) - (x + 6) = $ _____

15. $(4x - 2) + 3(x + 1) = $ _____

16. $(5x + 4) - 2(x + 1) = $ _____

17. $5(x + 2) - 2(x + 2) = $ _____

Write a simplified expression for the perimeter of the rectangle or triangle.

18.

$7x$

$8x$

Perimeter = _____

19.

$5n$

$9n$

Perimeter = _____

20.

$18x$ $18x$

$21x$
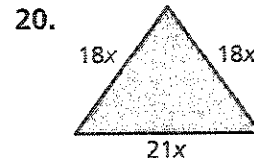
Perimeter = _____

21. The original cost of a cell phone is x dollars. The phone is on sale for 35% off. Write a simplified expression for the sale cost. _____

35% Off

REVIEW: Order of Operations

Name _____

Key Concept and Vocabulary

"Please Excuse My Dear Aunt Sally"   Simplify $4^2 \div 2 + 3(9 - 5)$.

1st Parentheses

2nd Exponents

3rd Multiplication and Division (from left to right)

4th Addition and Subtraction (from left to right)

$$4^2 \div 2 + 3(9 - 5) = 4^2 \div 2 + 3 \cdot 4$$
$$= 16 \div 2 + 3 \cdot 4$$
$$= 8 + 12$$
$$= 20$$

Order of Operations

Skill Examples

1. $18 \div 2 - 4 = 9 - 4 = 5$

2. $12 \cdot (6 - 2) = 12 \cdot 4 = 48$

3. $14 \cdot 3 - 19 = 42 - 19 = 23$

4. $20 \div 10 + 21 \cdot 5 = 2 + 105 = 107$

5. $(2 + 3)^2 - 5 = 25 - 5 = 20$

Application Example

6. At a museum, 4 adults pay $5 each and 6 children pay $3 each. What is the total cost of the tickets?

$$4 \cdot 5 + 6 \cdot 3 = 20 + 18$$
$$= 38$$

∴ The total cost is $38.

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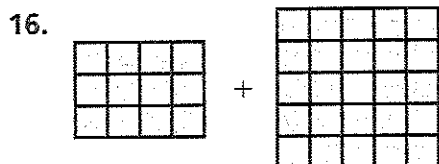
Check your answers at BigIdeasMath.com.

Simplify.

7. $3^2 + 5(4 - 2) =$ _____

8. $3 + 4 \div 2 =$ _____

9. $10 \div 5 \cdot 3 =$ _____

10. $4(3^3 - 8) \div 2 =$ _____

11. $3 \cdot 6 - 4 \div 2 =$ _____

12. $12 + 7 \cdot 3 - 24 =$ _____

Insert parentheses to make the statement true.

13. $5^2 - 15 \div 5 = 2$

14. $12 \cdot 2^3 + 4 = 144$

15. $91 - 21 \div 7 = 10$

Write an expression for the total area of the two rectangles. Evaluate your expression.

16.

17.

18. **ADMISSION** At a baseball game, 6 adults pay $20 each and 4 children pay $10 each. What is the total cost of the tickets? _____
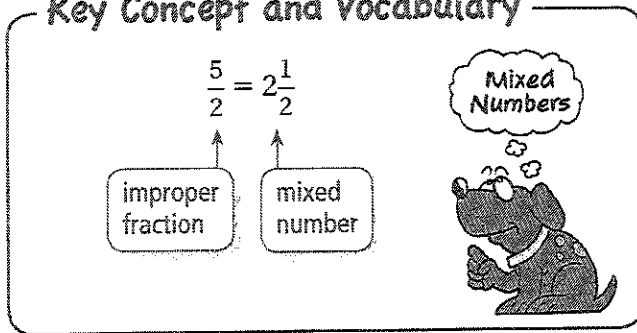
19. **INSERTING PARENTHESES** Insert parentheses in the expression $4 + 2^3 - 5 \cdot 2$ in two ways: (a) so that the value is 10 and (b) so that the value is 14.
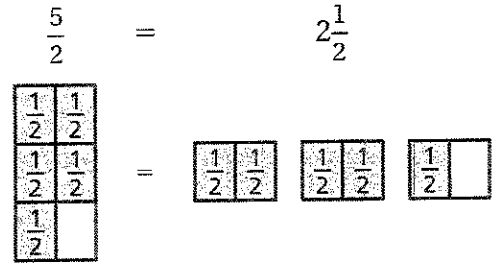
(a) _____

(b) _____

REVIEW: Mixed Numbers and Improper Fractions

Name _____

Key Concept and Vocabulary

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

improper fraction → mixed number

Mixed Numbers
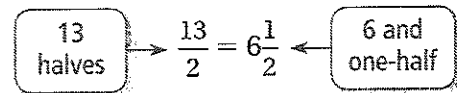
Visual Model

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

Skill Examples

1. $\frac{7}{3} = 2\frac{1}{3}$

2. $\frac{8}{4} = 2$

3. $2\frac{1}{4} = \frac{8}{4} + \frac{1}{4} = \frac{9}{4}$

4. $3\frac{3}{5} = \frac{15}{5} + \frac{3}{5} = \frac{18}{5}$

Application Example

5. During a month, you used 13 half-hours of phone time. How many hours did you use?

13 halves → $\frac{13}{2} = 6\frac{1}{2}$ ← 6 and one-half

∴ You used $6\frac{1}{2}$ hours.

PRACTICE MAKES PURR-FECT™

Check your answers at BigIdeasMath.com.

Write the improper fraction as a mixed number.

6. $\frac{4}{3} = $ _____

7. $\frac{3}{2} = $ _____

8. $\frac{8}{3} = $ _____

9. $\frac{9}{6} = $ _____

10. $\frac{7}{4} = $ _____

11. $\frac{28}{3} = $ _____

12. $\frac{19}{4} = $ _____

13. $\frac{11}{2} = $ _____

Write the mixed number as an improper fraction.

14. $2\frac{2}{3} = $ _____

15. $5\frac{1}{4} = $ _____

16. $3\frac{2}{5} = $ _____

17. $1\frac{3}{8} = $ _____

18. Rewrite the sentence using a mixed number. Susan drinks five-fourths of a quart of milk.

_____

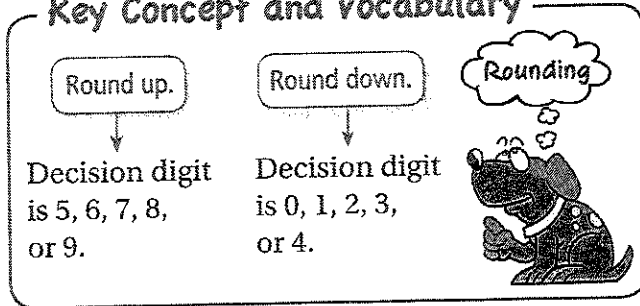19. Rewrite the sentence using an improper fraction. Tom runs for 2 and one quarter hours.

_____

20. **NUMBER LINE** Graph the improper fractions on the number line: $\frac{5}{3}, \frac{7}{2},$ and $\frac{13}{3}$.
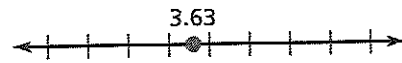
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Topic 7.1

REVIEW: Rounding Decimals

Name _____

Key Concept and Vocabulary

Round up.	Round down.	Rounding

Decision digit is 5, 6, 7, 8, or 9.

Decision digit is 0, 1, 2, 3, or 4.

Visual Model

Round to the *nearest tenth*.

3.63

3.63 rounds to 3.6 because
3.63 is closer to 3.6 than to 3.7.

Skill Examples

1. To the *nearest tenth*:
   4.78 rounds to 4.8.   Round up.

2. To the *nearest hundredth*:
   0.143 rounds to 0.14.   Round down.

3. To the *nearest thousandth*:
   0.0029 rounds to 0.003. Round up.

Application Example

4. Gasoline costs $2.899 per gallon. Round this price to the nearest cent.

   To the *nearest cent*: 2.899 rounds to 2.90.

   ∴ The gasoline costs about $2.90 per gallon.

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Round to the nearest tenth. (The symbol ≈ means "is approximately to.")

5. 0.16 ≈ _____   6. 0.038 ≈ _____   7. 1.05 ≈ _____   8. 10.049 ≈ _____

Round to the nearest hundredth.

9. 0.0123 ≈ _____   10. 2.406 ≈ _____   11. 0.463 ≈ _____   12. 12.006 ≈ _____

Round to the nearest thousandth.

13. 0.0456 ≈ _____   14. 4.5062 ≈ _____   15. 1.0043 ≈ _____   16. 0.6666 ≈ _____

Round the butterfly's weight to the nearest hundredth of a gram.

17. 0.034 g

Weight ≈ _____

18. 0.107 g

Weight ≈ _____

19. 0.008 g
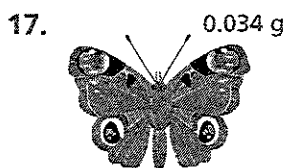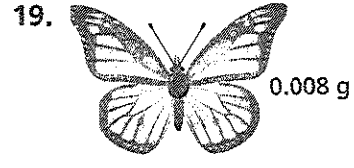
Weight ≈ _____

20. **PRICE OF GAS** Gasoline costs $2.379 per gallon. Round this price to the nearest cent. _____

21. **BUTTERFLY WEIGHTS** All species of butterflies weigh between 0.003 gram and 3 grams. Explain why it would not make sense to round some butterfly weights to the nearest hundredth of a gram.

_____

_____