

Key to examples:

1) Evaluate  $4a - 2b^2$  if  $a = \frac{3}{4}$  and  $b = -3$

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

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

$$3 - 18$$

$$3 + -18$$

$$-15$$

## Key to Ch. 5 Expressions Study Guide

2) Circle the examples of like terms:

x and 8x

9y and  $2y^2$

3 and 3x

7x and 6y

8 and -1

5ab and -3ab

True or False ? For the algebraic expression  $7x - 2 + 5y - 6x$

\_\_\_ 7 is a coefficient (T)

\_\_\_ 5 is a constant (F)

\_\_\_ -2 is a constant (T)

\_\_\_ 5 is a coefficient (T)

\_\_\_ There are three terms (F)

Write an algebraic expression with the following characteristics:  
three terms  
two like terms  
a constant of 5  
a coefficient of -3

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Example:  $-3x + 4x + 5$

Key to examples:

3) Write algebraic expressions for the following:

$n - 3$       three less than a number "n"

$2n$           twice a number

$4g + 3$       the total cost of renting bowling shoes for \$3 and playing "g" games for \$4 per game

$0.75j$         the sale price for an item that is marked 25% off a regular price of "j" dollars

4)

Find the next three numbers in the sequence    4, 8, 12, 16, 20, 24, 28

Write a simplified algebraic expression for the perimeter of a rectangle whose length is  $(2x + 3)$  and width is  $(x + 2)$

$$P = 2l + 2w$$

$$P = 2(2x+3) + 2(x+2)$$

$$P = 2(2x) + 2(3) + 2(x) + 2(2)$$

$$P = 4x + 6 + 2x + 4$$

$$P = 6x + 10$$

Aaron is  $(5x + 2)$  inches tall and Ben is  $(8x - 3)$  inches tall. Write a simplified algebraic expression for how much taller Ben is than Aaron.

$$(8x-3)-(5x+2)$$

$$8x-3+(-1)(5x+2)$$

$$8x - 3 + (-1)(5x) + (-1)(2)$$

$$8x - 3 + -5x + -2$$

$$3x + -5$$

$$3x - 5$$

Find the value of the nth term of this sequence:

2, 4, 6, 8, 10, ...     $(2n)$

Key to examples:

5)

$$7x + x$$

$$7x + 1x$$

$$8x$$

$$(6x + 2) + 2(4x + 1)$$

$$6x + 2 + 2(4x) + 2(1)$$

$$\boxed{6x} + \triangle + \boxed{8x} + \triangle$$

$$14x + 4$$

$$6x - y + 9 - 8x - 2y$$

$$\boxed{6x} + \triangle - 1y + 9 + \boxed{-8x} + \triangle - 2y$$

$$-2x + -3y + 9$$

$$-2x - 3y + 9$$

$$3(2x + 4)$$

$$3(2x) + 3(4)$$

$$6x + 12$$

$$4 - (3x - 2) + 8x$$

$$4 + -1(3x + -2) + 8x$$

$$4 + (-1)(3x) + -1(-2) + 8x$$

$$\textcircled{4} + \boxed{-3x} + \textcircled{2} + \boxed{8x}$$

$$5x + 6$$

$$-8(x + 2) - 4(5x - 3)$$

$$-8(x) + -8(2) + -4(5x + -3)$$

$$-8x + -16 + -4(5x) + -4(-3)$$

$$\boxed{-8x} + \textcircled{-16} + \boxed{-20x} + \textcircled{12}$$

$$-28x + -4$$

$$-28x - 4$$

6)

$$7(8.99)$$

$$7(9.00 - 0.01)$$

$$7(9) - 7(0.01)$$

$$63 - 0.07$$

$$62.93$$

$$4(36)$$

$$4(30 + 6)$$

$$4(30) + 4(6)$$

$$120 + 24$$

$$144$$

$$2(4\frac{1}{2})$$

$$2(4 + \frac{1}{2})$$

$$2(4) + 2(\frac{1}{2})$$

$$8 + 1$$

$$9$$

Key to Examples:

7) Identify the property that was used:

Distributive Property

$$5(9) + 2(9) = (5 + 2)(9)$$

Commutative Property

$$9(8) = 8(9)$$

Multiplication Property of Zero

$$x(0) = 0$$

Identity Property of Multiplication

$$1(6x + 3) = 6x + 3$$

Associative Property of Addition

$$2 + (3 + 10) = (2 + 3) + 10$$

8) Find the GCF and these linear expressions. (See p.416-417)

Factor completely if possible:  $8x(2 + x) = 16x + 8x^2$

$$3(5x + 1) = 15x + 3$$

Not Factorable  $4x + 7y$

$$8g(3h - 5) = 24gh - 40g$$

9) Circle the equivalent expressions. Show how you know they are or are not equivalent

$$7x - 1 = 1 - 7x$$

Subtraction not commutative

$$\textcircled{-1x = -x}$$

Identity Property of Multiplication

$$8 + (4 + 3) = 8(4) + 8(3)$$

Distributive property needs two operations

$$\textcircled{9x + -2 = 9x - 2}$$

Subtraction is the same as adding the opposite

$$-4 - y = -1(y - 4)$$

Choose the right side to simplify

$$-1(y + -4) \text{ Change } - \text{ to } + -$$

$$-1(y) + -1(-4) \text{ Distributive property}$$

$$-1y + 4$$

$$4 + -y \text{ (commutative property)}$$

$$4 - y \text{ (definition of subtraction)}$$

Not the same as  $-4 - y$

$$\textcircled{-5x + 3 = 3 - 5x}$$

$$= 3 + -5x \text{ (Def of subtraction)}$$

$$= -5x + 3 \text{ (commutative)}$$

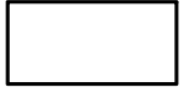
$$\textcircled{2(4x + 8) = 8(x + 2)}$$

$$2(4x) + 2(8) = 8(x) + 8(2)$$

$$8x + 16 = 8x + 16$$

More Practice (Mixed Concepts)

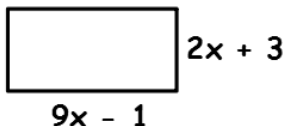
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<p>10) Find the GCF of <math>12a^2</math> and <math>9a</math></p> <p style="text-align: center;"><math>3a</math></p>	<p>11) Name the coefficient(s) in this algebraic expression:</p> <p><math>8x - y + 3</math></p> <p style="text-align: center;"><math>8x + -1y + 3</math></p> <p style="text-align: center;">8 and -1</p>	<p>12) Which of these are like terms?</p> <p>a and 7      <math>8n</math> and <math>2n^2</math></p> <p><math>-10</math> and <math>3</math>      <math>-x</math> and <math>4x</math></p> <p><math>2ab</math> and <math>3a</math>      <math>4y</math> and <math>10y</math></p>	<p>13) Completely factor this expression:</p> <p><math>24ab + 18a</math></p> <p style="text-align: center;"><math>6a(4b + 3)</math></p>
<p>14) Simplify: <math>7x + x + 2x</math></p> <p style="text-align: center;"><math>7x + 1x + 2x</math></p> <p style="text-align: center;"><math>10x</math></p>	<p>15) Completely factor:</p> <p><math>15x + 5x</math></p> <p style="text-align: center;"><math>5x(3 + 1)</math></p>	<p>16) Use the distributive property to evaluate this expression: <math>-6(5 + -9)</math></p> <p style="text-align: center;"><math>-6(5) + -6(-9)</math></p> <p style="text-align: center;"><math>-30 + 54</math></p> <p style="text-align: center;">24</p>	<p>17) Simplify: <math>(x + 3) - 2(x - 5)</math></p> <p style="text-align: center;"><math>1x + 3 + -2(x + -5)</math></p> <p style="text-align: center;"><math>1x + 3 + -2(x) + (-2)(-5)</math></p> <p style="text-align: center;"><math>1x + 3 + -2x + 10</math></p> <p style="text-align: center;"><math>-1x + 13</math></p> <p style="text-align: center;"><math>-x + 13</math></p>
<p>18) In the sequence 0.3, 0.6, 0.9</p> <p>A) Find the next two terms</p> <p style="text-align: center;">Add 0.3 to previous term</p> <p style="text-align: center;">1.2, 1.5</p> <p>B) Write an algebraic expression for the n-th term</p> <p style="text-align: center;">1st <math>1(0.3) = 0.3</math></p> <p style="text-align: center;">2nd <math>2(0.3) = 0.6</math></p> <p style="text-align: center;">n-th <math>n(0.3) = 0.3n</math></p>	<p>19) Find the perimeter of this rectangle:</p> <div style="text-align: center;">  </div> <p style="text-align: center;"><math>P = 10x + 2x + 10x + 2x</math></p> <p style="text-align: center;"><math>P = 24x</math></p>	<p>20) Which of the following meet all of these conditions?</p> <p>I have 3 terms.</p> <p>I have a coefficient of -7</p> <p>I have a constant of 2</p> <p>Two of my terms are "like terms"</p>	<p>A) <math>2a - 7a + 5a</math></p> <p>B) <math>2 - 7x + 3 + 7x</math></p> <p>C) <math>-7 + 2a + 10</math></p> <p>D) <math>7x + 2</math></p> <p style="text-align: center;"><math>12x - 7x + 2</math></p>

## More Practice (Mixed Concepts)

## KEY

21) Show how to find the perimeter of this rectangle. Give final answer in simplified form.



$$P = 2l + 2w$$

$$P = 2(2x + 3) + 2(9x - 1)$$

$$P = 2(2x) + 2(3) + 2(9x + -1)$$

$$P = 4x + 6 + 2(9x) + 2(-1)$$

$$P = 4x + 6 + 18x + -2$$

$$P = 22x + 4$$

22) Simplify:

$$-7x - y + 6 + x - 8y - 2$$

$$\underline{-7x} + \underline{-1y} + \textcircled{6} + \underline{1x} + \underline{-8y} + \textcircled{-2}$$

$$-6x + -9y + 4$$

$$-6x - 9y + 4$$

23) Simplify:

$$-9(x + 4) - 5(x - 3)$$

$$-9(x + 4) + -5(x + -3)$$

$$-9(x) + -9(4) + -5(x) + -5(-3)$$

$$\underline{-9x} + \textcircled{-36} + \underline{-5x} + \textcircled{15}$$

$$-14x + -21$$

$$-14x - 21$$

24) Show how to use the distributive property to do mental math to figure out the value of  $4(2.08)$

$$\begin{aligned} 4(2.08) &= 4(2 + 0.08) \\ &= 4(2) + 4(0.08) \\ &= 8 + 0.32 \\ &= 8.32 \end{aligned}$$

25) Show how to use the distributive property to do mental math to figure out the value of  $8(26)$

$$\begin{aligned} 8(20 + 6) &= 8(20) + 8(6) \\ &= 160 + 48 \\ &= 208 \end{aligned}$$

26) Simplify:

$$3(-6x + 1) - 5(-9x - 2)$$

$$3(-6x + 1) + -5(-9x + -2)$$

$$3(-6x) + 3(1) + -5(-9x) + -5(-2)$$

$$\underline{-18x} + \textcircled{3} + \underline{45x} + \textcircled{10}$$

$$27x + 13$$