

Accelerated Math - KEY to ch. 7 Study Guide on Expressions

Key to examples:

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

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

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

$$3 - 18$$

$$3 + -18$$

$$-15$$

2) Circle the examples of like terms:

x and 8x

9y and 2y²

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)

___ 6 is a coefficient (F)

___ 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

ANSWERS VARY

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

Key to examples:

3) Write algebraic expressions for the following:

- $n - 3$ three less than a number "n"
- $4g + 3$ the total cost of renting bowling shoes for \$3 and playing "g" games for \$4 per game
- $12f$ the number of inches in "f" feet
- $0.75j$ the sale price for an item that is marked 25% off a regular price of "j" dollars
- $25q+10d$ the total amount of cents if you have "q" quarters and "d" dimes

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.

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

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

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

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

$$3x + -5$$

$$3x - 5$$

Sara n
 Meg $2n$
 Jen $2n + 3$

Total miles

Sara + Meg + Jen

$$(n) + (2n) + (2n + 3)$$

$$n + 2n + 2n + 3$$

$$5n + 3 \text{ miles}$$

Key to examples:

4)

$7x + x$ $7x + 1x$ $8x$	$(6x + 2) + 2(4x + 1)$ $6x + 2 + 2(4x) + 2(1)$ $\boxed{6x} + \triangle + \boxed{8x} + \triangle$ $14x + 4$	$6x - y + 9 - 8x - 2y$ $\boxed{6x} + \triangle + 9 + \boxed{-8x} + \triangle$ $-2x + -3y + 9$ $-2x - 3y + 9$
$3(2x + 4)$ $3(2x) + 3(4)$ $6x + 12$	$4 - (3x - 2) + 8x$ $4 + -1(3x + -2) + 8x$ $4 + (-1)(3x) + -1(-2) + 8x$ $\textcircled{4} + \boxed{-3x} + \textcircled{2} + \boxed{8x}$ $5x + 6$	$-8(x + 2) - 4(5x - 3)$ $-8(x) + -8(2) + -4(5x + -3)$ $-8x + -16 + -4(5x) + -4(-3)$ $\boxed{-8x} + \textcircled{-16} + \boxed{-20x} + \textcircled{12}$ $-28x + -4$ $-28x - 4$

5)

$7(8.99)$ $7(9.00 - 0.01)$ $7(9) - 7(0.01)$ $63 - 0.07$ 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
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Key to Examples:

6) Find the GCF and factor linear expressions. (See p.416-417)

<u>Factor completely if possible:</u> $8x(2 + x)$	$16x + 8x^2$
$3(5x + 1)$	$15x + 3$
<u>Not Factorable</u>	$4x + 7y$
$\frac{2}{3}(x + 36)$	$\frac{2}{3}x + 24$

Find the GCF of the following pairs of monomials

$6ab, 15a$	_____	$(3a)$
$9b^2, 14b$	_____	(b)
$64xy^2, 48x^2y$	_____	$(16xy)$

7) Circle the equivalent expressions. Show why they are or are not equivalent.

$7x - 1 = 1 - 7x$
Subtraction not commutative

$-1x = -x$
Identity Property of Multiplication

$8 + (4 + 3) = 8(4) + 8(3)$
Distributive property needs two operations

$9x + -2 = 9x - 2$
Subtraction is the same as adding the opposite

$-4 - y = -1(y - 4)$
Choose the right side to simplify
 $-1(y + -4)$ Change - to + -
 $-1(y) + -1(-4)$ Distributive property

$-5x + 3 = 3 - 5x$
↓
 $= 3 + -5x$ (Def of subtraction)
 $= -5x + 3$ (commutative)

$2(4x + 8) = 8(x + 2)$
 $2(4x) + 2(8) = 8(x) + 8(2)$
 $8x + 16 = 8x + 16$

$-1y + 4$
 $4 + -y$ (commutative property)
 $4 - y$ (definition of subtraction)
Not the same as $-4 - y$

8) Simplify algebraic expressions completely by showing all steps shown in class.

A) $\underline{-7x} + \underline{2x} + 10 + \underline{x}$

$-4x + 10$

B) $(6x - 2) - (-5x + 7)$

$6x - 2 + -1(-5x + 7)$

$6x + -2 + -1(-5x) + -1(7)$

$\underline{6x} + \underline{-2} + \underline{5x} + \underline{-7}$

$11x + -9$

$\underline{11x - 9}$

C) $4 + 6(-2x + 5)$

$4 + 6(-2x) + 6(5)$

$\underline{4} + -12x + \underline{30}$

$\underline{-12x + 34}$

D) $-x - 4x - 8 - 3x - 7$

$\underline{-1x} + \underline{-4x} + -8 + \underline{-3x} + -7$

$-8x + -15$

$\underline{-8x - 15}$

E) $-5(x - 3) - 6(2x - 4)$

$-5(x + -3) + -6(2x + -4)$

$-5(x) + -5(-3) + -6(2x) + -6(-4)$

$\underline{-5x} + \underline{15} + \underline{-12x} + \underline{24}$

$\underline{-17x + 39}$

F) $10x + 2(-7x + 1)$

$10x + 2(-7x) + 2(1)$

$10x + -14x + 2$

$\underline{-4x + 2}$

G) $-\frac{3}{4}(a + 2) + (\frac{2}{3}a - 8) - \frac{3}{8}(-4a + 16)$

$\frac{-3}{4}(a) + \frac{-3}{4}(2) + \frac{2}{3}(a) + -8 + \frac{-3}{8}(-4a + 16)$

$\frac{-3}{4}a + \frac{-3}{2} + \frac{2}{3}a + -8 + \frac{-3}{8}(-4a) + \frac{-3}{8}(16)$

$\boxed{\frac{-3}{4}a} + \boxed{\frac{-3}{2}} + \boxed{\frac{2}{3}a} + \boxed{-8} + \boxed{\frac{3}{2}a} + \boxed{-6}$

$\boxed{\frac{-9}{12}a} + \boxed{\frac{8}{12}a} + \boxed{\frac{18}{12}a} + -15\frac{1}{2}$

$\frac{17}{12}a + -\frac{31}{2}$

$\underline{\frac{17}{12}a - \frac{31}{2}}$

9) Solve application problems that involve percents.

A) Find the area of the shaded region.

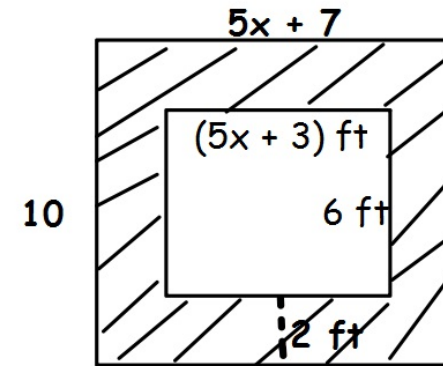
$$A_{\text{shaded part}} = A_{\text{large rectangle}} - A_{\text{small rectangle}}$$

$$A_{\text{shaded part}} = 10(5x + 7) - 6(5x + 3)$$

$$A_{\text{shaded part}} = 50x + 70 - 30x - 18$$

$$A_s = 20x + 52$$

$$A_s = 20x + 52 \text{ sq ft}$$



The shaded area has a width of 2 ft all the way around.

B) The area of a square is $8x + 12$ square units.
Find all possible dimensions that do not involve fractions.

x means "by" when you do dimensions

$$1 \times (8x + 12)$$

$$2 \times (4x + 6)$$

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

C) The perimeter of a square is $24x - 16$.
Find the length of one side of the square.

$$\text{one side is } \frac{24x - 16}{4} = \frac{4(6x - 4)}{4} = 6x - 4$$

10) Be able to show the mathematics behind "math magic" problems.

Follow these steps with a number of your choice and then let the number be n and show how it works algebraically.

	<u>Number Example</u>	<u>Algebraic Steps</u>
Choose a number	10	n
Add 8	18	$n + 8$
Multiply by 6	108	$6(n+8) = 6n + 48$
Subtract 12	96	$6n + 48 - 12 = 6n + 36$
Divide by 6	16	$\frac{6n+36}{6} = \frac{6(n+6)}{6} = n + 6$
Subtract the original number	6	$n + 6 - n = 6$