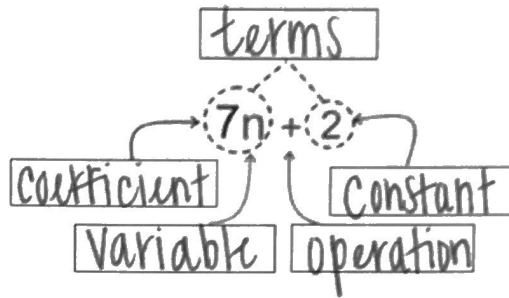


Name: KEY

FOUNDATIONS OF ALGEBRA – UNIT 3 STUDY GUIDE

Learning Target #1: Algebraic Expressions:

- Fill in the boxes accordingly using the following vocabulary words: **coefficient**, **constant**, **operation**, **terms** and **variable**



- The total daily expenses to operate a Paul's pizza shop are the cost of salaries and ingredients. He has five employees and he pays each worker a daily rate. On average, it costs the same amount of money to make each pizza. This expression shows the total daily expenses for Paul's shop to make x pizzas:

of employees

$5(25) + 0.50x$
daily rate

What does the term $5(25)$ represent?

cost of salaries

monomial: 1 term
 binomial: 2 terms
 trinomial: 3 terms

Learning Target #2: Operations with Polynomials:

- Label the following as either monomial, binomial or trinomial:
 - $x^2 + x$ *binomial*
 - a^4b^2 *monomial*
 - x^2y^3 *monomial*
 - $3x^3 + 2x^2 + 1$ *trinomial*

sum of degrees

- What is the degree of the monomial $2x^3x^4$?

$3 + 4 = 7$

highest degree

- What is the degree of the binomial $2x^3 + x^4$?

4

- What is the result of $(6x^2 + 5x - 1) - (x^2 - 2x + 2)$?

rewrite: $(\underline{6x^2} + \underline{5x} - \underline{1}) + (\underline{-x^2} + \underline{2x} - \underline{2})$

$$\begin{array}{r} 6x^2 + 5x - 1 \\ + -1x^2 + 2x - 2 \\ \hline 5x^2 + 7x - 3 \end{array}$$

- What is the sum of $(-7x + 6) + (x^2 - 8x)$

$$\begin{array}{r} -7x + 6 + 0 \\ + -8x + 0 + x^2 \\ \hline -15x + 6 + x^2 \end{array} \Rightarrow \boxed{x^2 - 15x + 6}$$

standard form:

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8. What is the value of m and n in the following equations:

$$(4x^2 + 2x - 8) + (mx^2 - nx + 4) = 7x^2 - 5x - 4$$

$$4 + m = 7$$

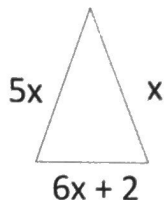
$$\boxed{m = 3}$$

$$2 - n = -5$$

$$\boxed{n = 7}$$

$$\begin{array}{r} 4x^2 + 2x - 8 \\ + mx^2 - nx + 4 \\ \hline 7x^2 - 5x - 4 \end{array}$$

9. Write an algebraic expression that represents the perimeter of the triangle:



perimeter of $\Delta = a + b + c$

$$= (5x) + (x) + (6x + 2)$$

$$\begin{array}{r} 5x + 0 \\ 1x + 0 \\ + 6x + 2 \\ \hline 12x + 2 \end{array}$$

10. What is the **product** of $(x - 6)(2x + 2)$?

$$\boxed{2x^2 - 10x - 12}$$

$$\begin{array}{r} 2x + 2 \quad -10x \\ \times \quad 2x + 2 \\ \hline 4x^2 + 4x \\ -6 \quad -12x - 12 \\ \hline 2x^2 - 10x - 12 \end{array}$$

11. What is the **product** of $(t - 3)(t + 5)$?

$$\boxed{t^2 + 2t - 15}$$

$$\begin{array}{r} t + 5 \quad 2t \\ \times \quad t + 5 \\ \hline t^2 + 5t \\ -3 \quad -3t - 15 \\ \hline t^2 + 2t - 15 \end{array}$$

12. What is the **product** of $(x - 2)^2$?

$$(x - 2)(x - 2)$$

$$\boxed{x^2 - 4x + 4}$$

$$\begin{array}{r} x - 2 \quad 4x \\ \times \quad x - 2 \\ \hline x^2 - 2x \\ -2 \quad -2x + 4 \\ \hline x^2 - 4x + 4 \end{array}$$

13. Write the equivalent expression of:

$$6(2a + b) + 3(a + b) - 5(2a + b)$$

$$6 \begin{array}{|c|c|} \hline 2a & b \\ \hline \end{array} + 3 \begin{array}{|c|c|} \hline a & b \\ \hline \end{array} + -5 \begin{array}{|c|c|} \hline 2a & b \\ \hline \end{array}$$

$$\begin{array}{l} (12a + 6b) + (3a + 3b) + (-10a - 5b) \\ \hline 5a + 4b \end{array}$$

$$\begin{array}{r} 12a + 6b \\ 3a + 3b \\ + -10a - 5b \\ \hline 5a + 4b \end{array}$$

14. What is the **product** of $2y(y^2 + 6y - 10)$?

$$2y \begin{array}{|c|c|c|} \hline y^2 & 6y & -10 \\ \hline \end{array}$$

$$\boxed{2y^3 + 12y - 20y}$$

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15. For the expression $ax^2 + bx + c$, what is the value of "a" when you multiply $(x - 5)(x - 1)$?
 $|x^2 - 6x + 5$

$a=1$ $b=-6$ $c=5$

	x	-1
x	x^2	$-x$
-5	$-5x$	5

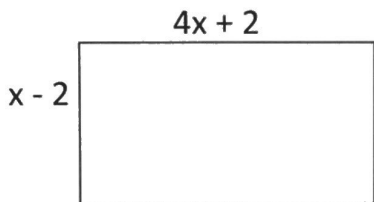
$-6x$

16. The total area of two rectangles can be represented by the expression $(x)(2x + 1) + (3x)(x + 2)$.
 Write the expression that could represent the total area of the two rectangles combined.

$$x \begin{array}{|c|c|} \hline 2x^2 & x \\ \hline \end{array} + 3x \begin{array}{|c|c|} \hline 3x^2 & 6x \\ \hline \end{array}$$

$$\begin{array}{r} 2x^2 + 1x \\ + 3x^2 + 6x \\ \hline 5x^2 + 7x \end{array}$$

17. Write an expression for the rectangle that represents the area of the rectangle. = $L \times W$



$$\begin{array}{r} x \quad -2 \\ 4x \quad \begin{array}{|c|c|} \hline 4x^2 & -8x \\ \hline \end{array} \\ +2 \quad \begin{array}{|c|c|} \hline 2x & -4 \\ \hline \end{array} \end{array}$$

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

$$= 4x^2 - 6x - 4$$

18. Which expression is equivalent to $2xy - 6x + 8y - 24$? (Hint: Work Backwards/Process of Elimination)

- ~~a.~~ $(2x - 8)(3 - y)$ $2x \cdot 3 = +6x \neq -6x$
- ~~b.~~ $(2x + 8)(3 - y)$ $2x \cdot 3 = +6x \neq -6x$
- c. $(2x + 8)(y - 3)$ $2x \cdot y = 2xy = 2xy \checkmark$ $8 \cdot y = +8y \checkmark$
- d. $(2x - 8)(y + 3)$ $2x \cdot y = 2xy = 2xy \checkmark$ $-8 \cdot y \neq -8y$

check:

	y	-3
$2x$	$2xy$	$-6x$
$+8$	$8y$	-24

\checkmark

19. Which of the following is equivalent to $x^4 - 16$? (Hint: Work Backwards/Process of Elimination)

- ~~a.~~ $(x^2 - 2)(x^2 - 2)$ $-2 \cdot -2 = +4 \neq -16$
- ~~b.~~ $(x^2 + 2)(x^2 - 2)$ $2 \cdot -2 = -4 \neq -16$
- ~~c.~~ $(x^2 - 4)(x^2 - 4)$ $-4 \cdot -4 = 16 \neq -16$
- d. $(x^2 + 4)(x^2 - 4)$ $4 \cdot -4 = -16 = -16$

check:

	x^2	-4
x^2	x^4	$-4x^2$
$+4$	$4x^2$	-16

\checkmark

20. Think: In your own words, write the difference between the expression $(x + y)^2$ and $x^2 + y^2$.

$(x+y)^2 = (x+y)(x+y) \Rightarrow$ multiply/product

$x^2 + y^2 \Rightarrow$ adding/sum