

1) What is the value of the expression $2x^2 + 1$ when $x = -2$?

$$2(-2)^2 + 1$$
$$2 \cdot 4 + 1$$
$$8 + 1$$

9

2) Which equation below illustrates the associative property of addition?

a) $(2 + 8) + (1 + 9) = (8 + 2) + (9 + 1)$

c) $5 + 2(3 + 4) = 5 + 6 + 8$

b) $5(2 + 7) = 10 + 35$

d) $(3 + 7) + 2 = 3 + (7 + 2)$

3) Which expression is equivalent to $10x - 35$?

$$5(2x - 7)$$

4) What is the equivalent polynomial expression to the binomial product of $(3x + 2)$ and $(2x - 1)$?

$$6x^2 - 3x + 4x - 2$$

$$6x^2 + x - 2$$

5) Which of the following is equivalent to the expression $\frac{8x+30}{10}$?

$$\frac{8}{10}x + \frac{30}{10} \Rightarrow \frac{4}{5}x + 3$$

6) When you add $3(2x - 5)$ to $2(4 - x)$, the result is:

$$\begin{array}{r} 6x - 15 + 8 - 2x \\ \hline 4x - 7 \end{array}$$

7) If the expression $4x - 3$ is equal to 11 for some value of x , then what is the expression $4x - 1$ equivalent to for the same value of x ?

$$\begin{array}{l} 14 - 3 = 11 \\ (4x) \end{array} \quad 14 - 1 = \textcircled{13}$$

8) Written in simplest exponential form the product $(3x^7)(-2x^3)$ is: _____?

$$\boxed{-6x^{10}}$$

9) Which of the following is equivalent to $(x+5)^2$?

$$(x+5)(x+5)$$

$$x^2 + 5x + 5x + 25 \Rightarrow x^2 + 10x + 25$$

10) Written as the product of two binomials, the expression $(x+3)(4x-1) - (x+3)(x-9)$ is:

Factor out GCF

$$(x+3)(4x-1-x+9)$$

$$(x+3)(3x+8)$$

11) If Mark's age is represented by m and Hatchi's age is represented by h then which of the following expressions represents five less than half the sum of Mark and Hatchi's ages?

$$\frac{m+h}{2} - 5$$

12) Write a trinomial expression that is equivalent to $(2x + 5)(3x - 2)$:

$$6x^2 - 4x + 15x - 10$$

$$6x^2 + 11x - 10$$

13) If $5x + 8 = 10$ for some value of x , then what is the value of $10x + 16$ for the same value of x ?

Explain how you arrived at your answer.

$$2(5x+8) = 10x+16 \quad \text{Multiply both sides by 2}$$

14) If the expression $(2x^3)^2(-5x^4)$ was placed in the form ax^b , where a and b are integers, then what is the value of $a + b$? Show the work that leads to your answer.

$$2x^3 \cdot 2x^3 = 4x^6$$

$$4x^6(-5x^4) = -20x^{10}$$

$$-20 + 10 = -10$$

15) Write the following expression in simplest binomial form:

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

$$\underline{12}x - 8 - \underline{8}x - 10$$

$$4x - 18 - 4x - 18$$

16) Show, using a numerical example, that the expressions $(x + 2)^2$ and $x^2 + 4$ are not equivalent

$$(x+2)^2 = (x+2)(x+2)$$

$$x^2 + 4x + 4$$

$$x = 3$$

$$(3+2)^2 = 5^2 = 25$$

$$3^2 + 4 = 9 + 4 = 13 \neq 25$$

17) Consider the binomial expression $3x + 1$.

- What property is illustrated in the identity $2(3x + 1) = 6x + 2$?
- What property is illustrated in the identity $6x + (2 + 3) = (6x + 2) + 3$?
- If the expression $3x + 1$ is equal to -7 for some value of x , then what is the value of the expression $6x + 5$ for the same value of x ? Show the work that leads to your solution.

a) DISTRIBUTIVE

b) ASSOCIATIVE

$$c) 3x + 1 = -7$$

$$\begin{array}{l} 2(3x + 1) + 3 \rightarrow 2(-7) + 3 \\ 6x + 2 + 3 = \quad -14 + 3 \\ 6x + 5 \quad \quad \quad -11 \end{array}$$

18) Given the product $(x+8)(x+3)$ do the following:

- a) Show that this product is equivalent to $x^2 + 11x + 24$ by using the Distributive Property twice.
 b) Test the equivalency by using $x = 1$. Show the intermediate calculations.

$$\begin{array}{l}
 \textcircled{(x+8)} \textcircled{(x+3)} \\
 x \cdot 3 + x \cdot x + 8 \cdot 3 + 8 \cdot x \\
 3x + x^2 + 24 + 8x \\
 \begin{array}{r}
 8x + 3x \\
 \hline
 11x \\
 x^2 + 11x + 24
 \end{array}
 \end{array}$$

$$\begin{array}{l}
 (1+8)(1+3) \\
 9 \cdot 4 \\
 \textcircled{36} \\
 x^2 + 11x + 24 \\
 1^2 + 11(1) + 24 \\
 1 + 11 + 24 \\
 \textcircled{36}
 \end{array}
 =$$

19) Given the number n , write an expression for:

a) Twice the sum of n and 5

b) The sum of twice n and 5

c) Give a numerical example that shows these are NOT the same expression.

$$2(n+5) \rightarrow a$$

$$2n+5 \rightarrow b$$

$$n=3 \quad 2(3+5) \rightarrow 2 \cdot 8 = 16$$

$$2(3)+5 \rightarrow 6+5 = 11$$

$$11 \neq 16$$

20) Rewrite the expression below as an equivalent product of two binomials:

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

\leftarrow GCF 1st

Test the equivalency of the two expressions by using the value $x = 9$. Show your work.

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

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

$$(x-8)(2x+9) \rightarrow (9-8)(2(9)+9)$$

$$\text{!!! } \checkmark 27 = 27 \checkmark \quad 27$$

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

$$(1)(41) - (1)(14)$$

$$41 - 14$$

$$27$$

21) Fill in the real number property below that justifies each step in combining two linear binomials.

$$\begin{aligned}(4x + 5) + (3x + 6) &= 4x + (5 + 3x) + 6 && \text{ASSOCIATIVE P.} \\ &= 4x + (3x + 5) + 6 && \text{COMMUTATIVE P.} \\ &= (4x + 3x) + (5 + 6) && \text{ASSOCIATIVE P.} \\ &= \underline{x}(4x + 3) + (5 + 6) && \text{DISTRIBUTIVE P.} \\ &= 7x + 11 && \text{(Reverse Dist.)}\end{aligned}$$

22) Francisco is three years more than twice Jenna's age. Harrison is two years less than three times Jenna's age. If Jenna's age is given by a , then write an expression for Francisco's age, Harrison's age, and the sum of all three ages, in terms of a .

Francisco's Age:

Harrison's Age:

Sum of all three ages:

$$F: 2a + 3$$

$$H: 3a - 2$$

$$\text{Sum: } a + (2a + 3) + (3a - 2)$$

$$(a + 2a + 3a) + (3 - 2)$$

$$6a + 1$$