

Some important terms/concepts to know/remember. Define them!

- Natural Numbers -
- Whole Numbers -
- Integers -
- Rational Numbers -
- Irrational Numbers -
- PROPERTIES OF REAL NUMBERS
- Order of Operations -
- Properties of Exponents -

Identify whether the below numbers are RATIONAL or IRRATIONAL:

1) $\sqrt{47}$ I

2) $\frac{11}{9}$ R

3) $\frac{19}{4}$ R

4) $\sqrt{96}$ I

5) $\frac{19}{14}$ R

6) $\frac{15}{4}$ R

7) $\sqrt{84}$ I

8) -9 R

9) $\sqrt{72}$ I

10) 0 R

11) $\frac{8}{9}$ R

12) 3 R

13) $.3796$ R

14) π I

15. Give an example of the following properties:

(a) Distributive Property: $3(x+y) = 3x+3y$

(b) Commutative Property of Addition: $2x+3x+5 = 2x+5+3x$

(c) Multiplicative Identity Property: $7 \cdot 1 = 7$

(d) Associative Property of Multiplication: $(3 \cdot x) \cdot y = 3 \cdot (x \cdot y)$

16. PEMDAS:

(a) $22 - 2 \cdot 6$

$$\begin{array}{r} 22 - 12 \\ 10 \end{array}$$

(b) $6 - \frac{1}{4} \cdot 16 + 21 \div 3$

$$\begin{array}{r} 6 - 4 + 21 \div 3 \\ 6 - 4 + 7 \\ * 2 + 7 = 9 \end{array}$$

(c) $(8-5)(5-3)^2$

$$\begin{array}{r} (3)(2)^2 \\ (3)(4) = 12 \end{array}$$

(d) $(4-1)^2 + 15 \div 3 - 1$

$$\begin{array}{r} 3 + 15 \div 3 - 1 \\ 3 + 5 - 1 \\ 8 - 1 = 7 \end{array}$$

(e) $10 - (3 + 4 \div 2)^2 + 15$

$$\begin{array}{r} 10 - (3 + 2)^2 + 15 \\ 10 - (5)^2 + 15 \\ 10 - 25 + 15 \\ -15 + 15 = 0 \end{array}$$

17. Simplify the following expressions. Remember to distribute:

(d) $6(2-3x)+1$

$$\begin{array}{r} 12 - 18x + 1 \\ 13 - 18x \end{array}$$

(e) $x+4-2\left(\frac{1}{2}x+3\right)$

$$\begin{array}{r} x+4-x-6 \\ -2 \end{array}$$

(f) $3(x+2)-2(x+1)$

$$\begin{array}{r} 3x+6-2x-2 \\ x+4 \end{array}$$

18.

If the expression $x-3$ has a value of -5 , then which of the following represents the value of $3x-9$? Explain how you arrived at your choice.

(1) -2

(3) -15

(2) -9

(4) -42

$$x-3 = -5$$

$$\begin{array}{r} +3 \quad +3 \\ \hline \end{array}$$

$$x = -2$$



$$3x - 9$$

$$3(-2) - 9$$

$$-6 - 9$$

$$-15$$

19. Working with Exponents:

(a) $r^3 \cdot r^6 = r^9$

(c) $x^3 + x^3 = 2x^3$

(b) $(-x^2)(3x^{10}) = -3x^{12}$

(d) $(y^2)^7 = y^{14}$

20.

Which of the following expressions is equivalent to $(x+7)^2$? Test with a value of x . Show your test.

(1) $x^2 + 49$ (3) $(x+7)(x+7)$

(2) $(x-7)(x+7)$ (4) $(7x)(7x)$

~~21.~~ DISREGARD

Rewrite the following two expressions as a product of two binomials:

$(2x-7)(x+2) + (3x+7)(x+2)$

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

22. Translating English to Algebra:

(c) If x represents a number, then write an expression for a number that is three more than one third the value of x .

$$\frac{1}{3}x + 3$$

(d) If n represents a number, then write an expression for two less than one fourth of n .

$$\frac{1}{4}n - 2$$

23. PRACTICE WITH DOUBLE DISTRIBUTION:

(7) $(x-2)(x-5)$

$$x^2 - 5x - 2x + 10$$

$$x^2 - 7x + 10$$

(8) $(x-9)(x-11)$

$$x^2 - 11x - 9x + 99$$

$$x^2 - 20x + 99$$

(9) $(x-2)^2$

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

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

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

(16) $(5x-4)(4x+1)$

$$20x^2 + 5x - 16x - 4$$

$$20x^2 - 11x - 4$$

(17) $(7z-7)(z+1)$

$$7z^2 + 7z - 7z - 7$$

$$7z^2 - 7$$

(18) $(x-1)^2$

$$(x-1)(x-1)$$

$$x^2 - x - x + 1$$

$$x^2 - 2x + 1$$

(22) $(3x+a)(x-2)$

$$3x^2 - 6x + ax - 2a$$

(23) $(x-4y)^2$

$$(x-4y)(x-4y)$$

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

$$x^2 - 8xy + 16y^2$$

(24) $(a+12)(a-5)$

$$a^2 - 5a + 12a - 60$$

$$a^2 + 7a - 60$$

(31) $(3t-4)(t+1)$

$$3t^2 + 3t - 4t - 4$$

$$3t^2 - t - 4$$

(32) $(x^2+3)(x^2+1)$

$$x^4 + x^2 + 3x^2 + 3$$

$$x^4 + 4x^2 + 3$$

(33) $(2a-b)(2a+b)$

$$4a^2 + 4ab - 2ab - b^2$$

$$4a^2 + 2ab - b^2$$

Name: _____

Date: _____

UNIT #2 QUARTERLY REVIEW

1. The value $x = 4$ is a solution to all of the following equations except which?

(1) $2x + 7 = 15$

(3) $x + 5 = 3x - 3$

(2) $3(x + 1) = x + 11$

(4) $x + 12 = 5x - 2$
 $16 \neq 18$

2. Which of the following is the solution to $\frac{x}{5} + 3 = 10$? _____

(1) 47

(3) 35

$\frac{x}{5} = 7$

(2) -1

(4) -5

$x = 35$

3. The sum of a number, n , and a number 5 larger than it is 41. Which of the following equations could be used to solve for the number? _____

(1) $n + 5n = 41$

(3) $5(n + 1) = 41$

$n + n + 5 = 41$

(2) $n + n + 5 = 41$

(4) $5n + n + 1 = 41$

4. Which of the following is *not* an equation? _____

(1) $5(2x + 1) = 10x + 5$

(3) $5 + 3 = 10$

(2) $4x - 1$

(4) $\frac{x}{2} + 1 = 7$

5. Which of the following values of x solves $3(x - 6) = 18$? _____

(1) $x = 12$

(3) $x = 8$

$3x - 18 = 18$

(2) $x = 0$

(4) $x = -6$

$3x = 36$

$x = 12$

6. If the expression $\frac{2x}{a} + b = c$ is solved for x in terms of a , b , and c , then $x =$


(1) $\frac{ac - ab}{2}$

(3) $\frac{ac - b}{2}$

$a \cdot \frac{2x}{a} = c - b \cdot a$

(2) $\frac{b + c}{2a}$

(4) $\frac{ab + c}{2}$

$\frac{2x}{2} = \frac{ac - ab}{2}$
 $x =$ 

7. Jenna manipulated the equation $4x + 7 = 10$ by adding -7 to both sides. Which of the following properties justifies this manipulation?

(1) The associative property of addition.

(2) The addition property of equality.

(3) The commutative property of addition.

(4) The multiplication property of equality.

8. Jody's older brother is only three years less than twice Jody's age. If the sum of their ages is 30, then which of the following is the age of Jody's brother?

(1) 7

(3) 19

let $x =$ Jody's age

$x + 2x - 3 = 30$

(2) 11

(4) 23

let $2x - 3 =$ Jody's older brother

$3x - 3 = 30$

$3x = 33$

$x = 11$

$2(11) - 3$
 $22 - 3 = 19$

9. Two correct first steps are shown for the same equation below. What property justifies each step?

$5(x - 3) = 20$

$5x - 15 = 20$

$5(x - 3) = 20$

$x - 3 = 4$

Distributive
 Prop.

Mult. Prop.
 of Equality

10. Give a property of real numbers (associative, commutative, or distributive) or a property of equality (addition or multiplication) that justifies each step in the solution of the equation shown below.

$$5(x+3)+2x=4x+9$$

(1) $5x+15+2x=4x+9$

(1) Dist. Property

(2) $5x+2x+15=4x+9$

(2) Commutative Prop.

(3) $(5+2)x+15=4x+9$

(3) Associative Prop.

$$7x+15=4x+9$$

(4) $7x+15-15=4x+9-15$

(4) Addition Prop.

$$7x=4x-6$$

(5) $7x-4x=4x-6-4x$

(5) Addition Prop.

(6) $(7-4)x=-6$

(6) Associative Prop.

$$3x=-6$$

(7) $\frac{1}{3} \cdot 3x = \frac{1}{3} \cdot -6$

(7) Multiplication Prop.

$$x=-2$$

11. Two consecutive even integers have the following property. When the smaller integer is added to three times the larger integer, the result is two less than five times the smaller integer.

Rafael tries to model this scenario with the equation show below. Unfortunately, Rafael has made an error on the left side of the equation. Explain what error he made.

$$n+3n+2=5n-2$$

No parenthesis around $n+2$

Write the correct equation (if you haven't already) and solve it to find the two consecutive even integers.

$$n + 3(n+2) = 5n - 2$$

$$n + 3n + 6 = 5n - 2$$

$$\begin{array}{r} 4n + 6 = 5n - 2 \\ -4n \quad -4n \end{array}$$

$$\begin{array}{r} 6 = n - 2 \\ +2 \quad +2 \\ 8 = n \end{array}$$

6 and 8

12. The sum of three consecutive even integers is negative forty-eight. Find the smallest integer.

- a) -16 b) -12 c) -18 d) -14

$$x + x + 2 + x + 4 = -48$$

$$3x + 6 = -48$$

$$\frac{3x}{3} = \frac{-54}{3} \quad x = -18$$

13. Five times the smallest of three consecutive odd integers is seven more than twice the largest. Find the largest integer.

$$x = 1^{st}$$

$$x + 2 = 2^{nd}$$

$$x + 4 = 3^{rd}$$

$$5(x) = 2(x + 4) + 7$$

$$5x = 2x + 8 + 7$$

$$\begin{array}{r} 5x = 2x + 15 \\ -2x \quad -2x \\ \hline 3x = 15 \end{array}$$

$$x = 5$$

$$5, 7, \underline{9}$$

14. Which property is illustrated by the equation $ax + ay = a(x + y)$?

- 1) associative 2) commutative 3) distributive 4) identity

15. Tori computes the value of $8 \cdot 95$ in her head by thinking $8(100 - 5) = 8 \times 100 - 8 \times 5$. Which number property is she using?

- 1) associative
2) distributive
3) commutative
4) closure

6.

The Arlington Math Team is taking small busses to its regional competition. Each bus holds only eight people and there are 35 students and two faculty advisors going on the trip.

If n represents the number of busses needed for the trip, write an inequality that models the different values of n that can get Arlington's Math Team to regionals.

$$\rightarrow \frac{8n}{8} \geq \frac{37}{8}$$

Solve the inequality and state the least number of busses needed to transport the Math Team.

5 buses

~~2 buses~~

7. Determine whether $x = 5$ is a solution to the compound inequality shown below. Justify your answer.

$$x + 8 > 11 \quad \text{and} \quad 2x - 3 < 7$$

$$\begin{array}{cc} 13 > 11 & 7 < 7 \\ \checkmark & \times \end{array}$$

False!

8. Consider the inequality given below.

$$-1 \leq 2x + 7 < 21$$

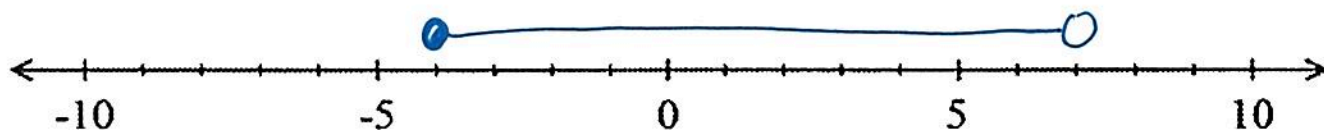
Rewrite this as two inequalities. Should they be joined with OR or AND?

$$\begin{array}{cc} -1 \leq 2x + 7 & 2x + 7 < 21 \\ -8 \leq 2x & 2x < 14 \\ -4 \leq x & x < 7 \end{array}$$

Is $x = 3$ part of the solution set of this compound inequality? Justify your response.

Yes!

Solve the inequality and graph its solution set on the number line below.



9. Solve the following equation for v in terms of all other variables involved.

$$\frac{2(v-h)}{k} = r$$

$$k \cdot \frac{2v-2h}{k} = r \cdot k$$

$$\begin{array}{r} 2v-2h = rk \\ \underline{+2h} \quad \underline{+2h} \end{array}$$

$$\frac{2v}{2} = \frac{rk+2h}{2}$$

$$v = \frac{rk+2h}{2}$$

10. Write the following inequalities in interval notation:

a. $-4 < x \leq 6$ $(-4, 6]$

b. $3 \leq x \leq 10$ $[3, 10]$

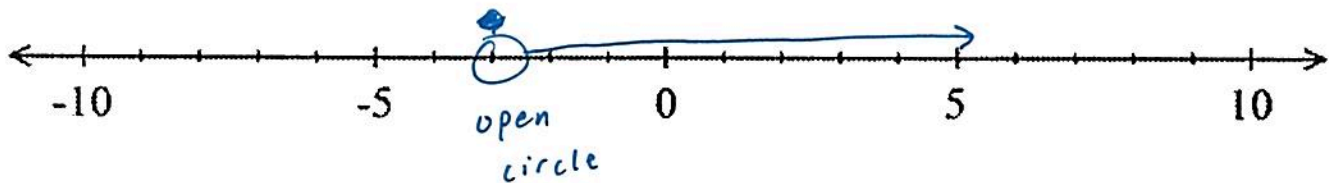
c. $-9 \leq x < 0$ $[-9, 0)$

11. Graph the solution to $-4x + 8 < 20$ on the number line below.

$$\underline{-8} \quad \underline{-8}$$

$$\begin{array}{r} -4x < 12 \\ \underline{-4} \quad \underline{-4} \end{array}$$

$$x > -3$$



12. Mr. Valentino is saving \$15 a week in order to have enough money for a Play Station that costs \$300. If he already had \$45 before he started saving, what is the minimum number of weeks he will need to save?

$$15w + 45 \geq 300$$

$$\underline{-45} \quad \underline{-45}$$

$$15w \geq 255$$

$$w \geq 17 \text{ weeks}$$

13. If $f(x) = -2x^2 + 3$ then $f(-3) =$

(1) -15

(3) 39

(2) 21

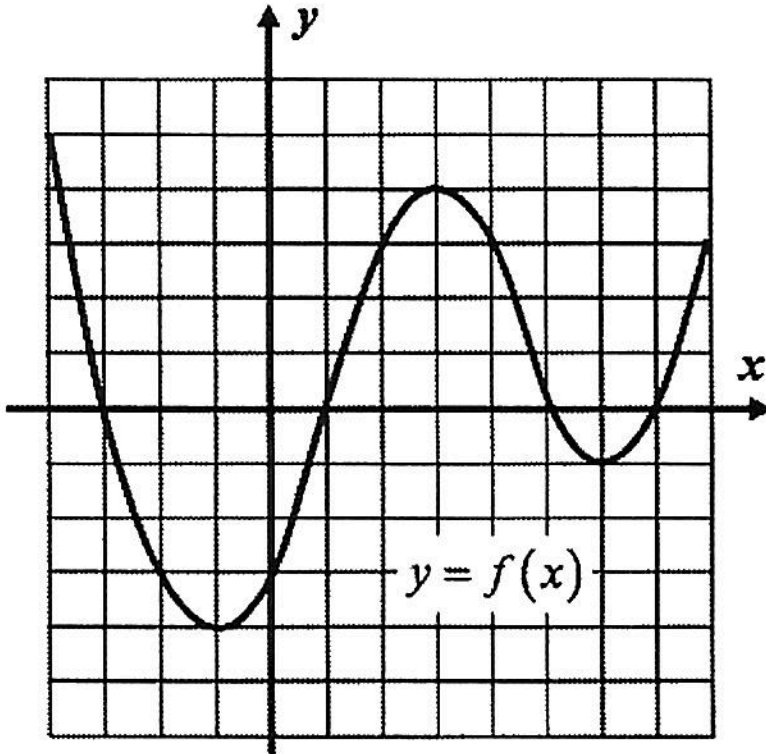
(4) -18

$$-2(-3)^2 + 3$$

$$-2(9) + 3$$

$$-18 + 3 = -15$$

14.



a. What is the value of $f(2) =$ (3)

b. What is the value of $f(0) =$ (-3)

c. What is the value of $f(3) + f(6)$

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

15. If the function $f(x) = 2x - 3$ and $g(x) = \frac{3}{2}x + 1$ then which of the following is a true statement?

(1) $f(0) > g(0)$ (3) $f(8) = g(8)$

(2) $f(2) = g(2)$ (4) $g(4) < f(4)$