

Name: _____

Date: _____

UNIT #2 – LINEAR EXPRESSIONS, EQUATIONS, AND INEQUALITIES
REVIEW QUESTIONS

Part I Questions

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) $x + 12 = 5x - 2$

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

(1) 47

(3) 35

(2) -1

(4) -5

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) $5(n + 1) = 41$

(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) $x = 8$

(2) $x = 0$

(4) $x = -6$

6. The inequality $2x + 1 > 15$ will be true when _____

(1) $x = 7$

(3) $x = 10$

(2) $x = 0$

(4) $x = 5$



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

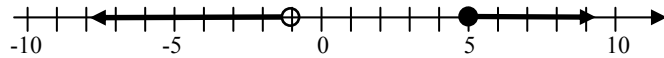
(1) $\frac{ac - ab}{2}$

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

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

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

8. Which of the following compound inequalities is shown graphed below?



(1) $-1 \leq x < 5$

(3) $x < -1$ or $x \geq 5$

(2) $-1 < x \leq 5$

(4) $x \leq -1$ or $x > 5$

9. The sum of two consecutive odd integers is at least 16. Which of the following inequalities would model this statement?

(1) $n + n + 3 < 16$

(3) $n + n + 2 > 16$

(2) $n + n + 2 \geq 16$

(4) $n + n + 3 \geq 16$

10. 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.

11. 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

(2) 11

(4) 23

12. The solution to $\frac{-2x}{3} + 7 < 15$ is the set

(1) $x > -12$

(3) $x > 33$

(2) $x < -6$

(4) $x < -10$



13. Which of the following intervals is equivalent to the statement $-3 < x \leq 9$?

(1) $(-3, 9]$

(3) $(-3, 9)$

(2) $[-3, 9)$

(4) $[-3, 9]$

14. Which of the following compound inequalities is *not* true?

(1) $5 > 3$ and $10 \leq 10$

(3) $-5 < 2$ or $6 > 10$

(2) $-6 < -1$ and $6 > 1$

(4) $-4 > 2$ or $3 < 1$

Free Response Questions

15. A rectangular garden has a length that is six feet more than twice its width. It takes 120 feet of fencing to completely enclose the garden's area.

Write an equation that could be used to find the width of the garden. Clearly define your variable.

Explain how your equation models the given information.

Find the length of the garden algebraically. Show how you arrived at your answer.

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

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

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

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



18. 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) _____

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

(3) $(5 + 2)x + 15 = 4x + 9$ (3) _____
 $7x + 15 = 4x + 9$

(4) $7x + 15 - 15 = 4x + 9 - 15$ (4) _____
 $7x = 4x - 6$

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

(6) $(7 - 4)x = -6$ (6) _____
 $3x = -6$

(7) $\frac{1}{3} \cdot 3x = \frac{1}{3} \cdot -6$ (7) _____
 $x = -2$

19. 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 shown below. Unfortunately, Rafael has made an error on the left side of the equation. Explain what error he made.

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

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



20. 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.

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

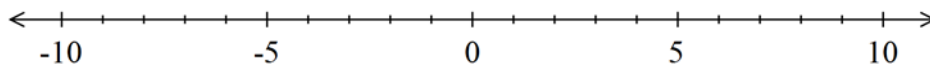
21. Consider the inequality given below.

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

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

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

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



22. Water is being drained out of a swimming pool at a constant rate of 780 gallons per hour. The swimming pool initially contained 45,000 gallons of water. A chemical additive must be added to the pool when it has no more than 15,000 gallons of water remaining in the pool.

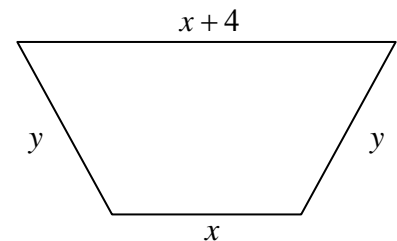
Write an expression for the amount of water remaining in the pool after h -hours.

Write an equation that could be solved to find the least number of hours before the chemical could be added.

Will it take longer than two days before the chemical can be added? Justify your response.

23. The trapezoid below has legs with lengths y feet and one base that is four feet longer than the other base, x .

The perimeter of this trapezoid is given by $P = 2x + 2y + 4$. Solve this equation for the leg length, y .



If the perimeter of the figure is 26 feet and the shorter base, x , is 8 feet, then find the length of the leg, y .

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

$$\begin{aligned} 5(x - 3) &= 20 \\ 5x - 15 &= 20 \end{aligned}$$

$$\begin{aligned} 5(x - 3) &= 20 \\ x - 3 &= 4 \end{aligned}$$

