

**Algebra 1  
Homework Packet**

**Chapter 1:  
Numbers, Equations,  
& Inequalities**

**Name** \_\_\_\_\_

## Rational and Irrational Numbers

Name: \_\_\_\_\_

Date: \_\_\_\_\_

1. Given:

$$L = \sqrt{2}$$

$$M = 3\sqrt{3}$$

$$N = \sqrt{16}$$

$$P = \sqrt{9}$$

Which expression results in a rational number?

- A.  $L + M$       B.  $M + N$       C.  $N + P$       D.  $P + L$

1. \_\_\_\_\_

2. Which statement is *not* always true?

- A. The product of two irrational numbers is irrational.  
B. The product of two rational numbers is rational.  
C. The sum of two rational numbers is rational.  
D. The sum of a rational number and an irrational number is irrational.

2. \_\_\_\_\_

3. Which statement is *not* always true?

- A. The sum of two rational numbers is rational.  
B. The product of two irrational numbers is rational.  
C. The sum of a rational number and an irrational number is irrational.  
D. The product of a nonzero rational number and an irrational number is irrational.

3. \_\_\_\_\_

4. For which value of  $P$  and  $W$  is  $P + W$  a rational number?

A.  $P = \frac{1}{\sqrt{3}}$  and  $W = \frac{1}{\sqrt{6}}$

B.  $P = \frac{1}{\sqrt{4}}$  and  $W = \frac{1}{\sqrt{9}}$

C.  $P = \frac{1}{\sqrt{6}}$  and  $W = \frac{1}{\sqrt{10}}$

D.  $P = \frac{1}{\sqrt{25}}$  and  $W = \frac{1}{\sqrt{2}}$

4. \_\_\_\_\_

5. Given the following expressions:

I.  $-\frac{5}{8} + \frac{3}{5}$

III.  $(\sqrt{5}) \cdot (\sqrt{5})$

II.  $\frac{1}{2} + \sqrt{2}$

IV.  $3 \cdot (\sqrt{49})$

Which expression(s) result in an irrational number?

A. II, only

B. III, only

C. I, III, IV

D. II, III, IV

5. \_\_\_\_\_

6. Is the sum of  $3\sqrt{2}$  and  $4\sqrt{2}$  rational or irrational? Explain your answer.

6. \_\_\_\_\_

7. Ms. Fox asked her class "Is the sum of 4.2 and  $\sqrt{2}$  rational or irrational?" Patrick answered that the sum would be irrational.

7. \_\_\_\_\_

State whether Patrick is correct or incorrect. Justify your reasoning.

8. Jakob is working on his math homework. He decides that the sum of the expression  $\frac{1}{3} + \frac{6\sqrt{5}}{7}$  must be rational because it is a fraction. Is Jakob correct? Explain your reasoning.

8. \_\_\_\_\_

Name: \_\_\_\_\_

Date: \_\_\_\_\_

**JUSTIFYING STEPS IN SOLVING AN EQUATION  
COMMON CORE ALGEBRA I HOMEWORK**

**FLUENCY**

1. Which property justifies the second line in the following solution?

(1) Multiplicative Property of Equality      (3) Distributive

(2) Associative

(4) Additive Property of Equality

$$3x + 2 = 8$$

$$3x + 2 - 2 = 8 - 2$$

2. What is the solution to the following equation? Show all work.

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

(1) No Solutions

(3)  $x = 2$

(2) Infinite Solutions

(4)  $x = -3$

3. Give a property of real numbers (associative, commutative, or distributive) or a property of equality (addition or multiplication) that justifies each step in the following equation:

$$3x + 1 + 2x - 7 = x + 22$$

(1)  $3x + 2x + 1 - 7 = x + 22$

(1) \_\_\_\_\_

(2)  $x(3 + 2) - 6 = x + 22$

(2) \_\_\_\_\_

$$5x - 6 = x + 22$$

(3)  $5x - 6 + 6 = x + 22 + 6$

(3) \_\_\_\_\_

$$5x = x + 28$$

(4)  $5x - x = x + 28 - x$

(4) \_\_\_\_\_

(5)  $x(5 - 1) = 28$

(5) \_\_\_\_\_

$$4x = 28$$

(6)  $\frac{1}{4} \cdot 4x = \frac{1}{4} \cdot 28$

(6) \_\_\_\_\_

$$x = 7$$

linear equations practice

Name: \_\_\_\_\_

Date: \_\_\_\_\_

1. What is the value of  $x$  in the equation  $4(2x + 1) = 27 + 3(2x - 5)$ ?
- A. 21    B. 9    C.  $7\frac{1}{2}$     D. 4

2. What is the value of  $x$  in the equation  $\frac{3}{4}x + 2 = \frac{5}{4}x - 6$ ?
- A. -16    B. 16    C. -4    D. 4

3. Solve for  $x$ :  $5x - 2(x + 1) = 10$ .

4. Solve for  $x$ :  $3(x + 5) + x = 7$

5. Solve for  $x$ :  $5(x + 2) - 3x = 12$

6. Solve for  $x$ :  $0.06x + 0.3x = 7.2$

7. Solve for  $s$ :  $7s + 4(3 - s) = 18$

Name: \_\_\_\_\_

Date: \_\_\_\_\_

**LINEAR WORD PROBLEMS**  
**COMMON CORE ALGEBRA I HOMEWORK**

**FLUENCY**

1. The sum of three times a number and 2 less than 4 times that same number is 15. Which of the following equations could be used to find the value of the number,  $n$ ? Explain how you arrived at your choice.

(1)  $3n + 4n - 2 = 15$

(3)  $4n + 3(n - 2) = 15$

(2)  $3n + 4(n - 2) = 15$

(4)  $3n - 4(n - 2) = 15$

2. Create a let statement for the following examples. Be sure to carefully read the question and figure out exactly what you are looking for. Then, set up an equation that summarizes the information in the problem and solve the equation and check for reasonableness.

(a) The sum of 3 less than 5 times a number and the number increased by 9 is 24. What is the number?

(b) Tom is 4 more than twice Andrews age. Sara is 8 less than 5 times Andrews age. If Tom and Sara are twins, how old is Andrew?

(c) A wireless phone plan costs Eric \$35 for a month of service during which he sent 450 text messages. If he was charged an fixed fee of \$12.50, how much did he pay per text?

(d) Daniel is currently 26 years older than his son. In six years he will be three times older than his son. How old are both of them now?

Name: \_\_\_\_\_

Date: \_\_\_\_\_

**SOLVING LINEAR EQUATIONS WITH UNSPECIFIED CONSTANTS  
COMMON CORE ALGEBRA I HOMEWORK**

**FLUENCY**

1. When  $\frac{3(x-k)}{w} = 4$  is solved for  $x$  in terms of  $w$  and  $k$ , its solution is which of the following? Show the algebraic manipulations you used to get your answer.

(1)  $\frac{4}{3}w + k$

(3)  $k - \frac{4}{3}w$

(2)  $k - \frac{3w}{4}$

(4)  $\frac{4}{3} + w - k$

2. Solve the following equations for  $x$ . It may help to make up an equation with numbers and solve it to the side to make sure you are not making any mistakes.

(a)  $a(x+b) - c = d$

(b)  $\frac{e(x+c)}{b} = 2$

(c)  $rx + qx - d = gc$

(d)  $2ax - b = cx + d$

(e)  $zx = 5g(2x - c)$

(f)  $\frac{ax}{b} + \frac{cx}{d} = e$

Name: \_\_\_\_\_

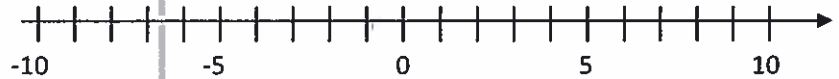
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**SOLVING LINEAR INEQUALITIES  
COMMON CORE ALGEBRA I HOMEWORK**

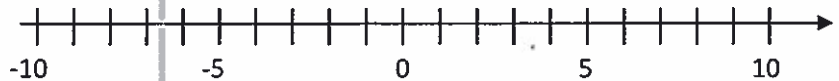
**FLUENCY**

1. Solve the inequality using the properties of inequalities and graph the final solution set on the number line provided.

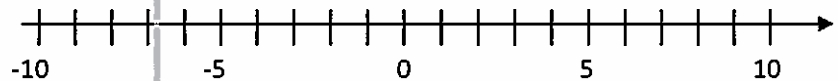
(a)  $5x - 6 \leq 24$



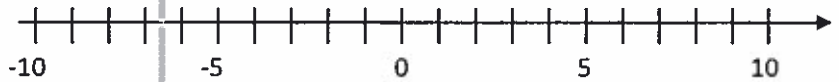
(b)  $2(5 - x) \leq 12$



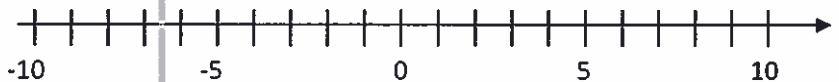
(c)  $6 - 4x > 18$



(d)  $8x - 6(x - 2) > 20 - 2x$



(e)  $\frac{3(2x+2)}{6} > \frac{1}{3}x + 2$





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)  $x = 5$

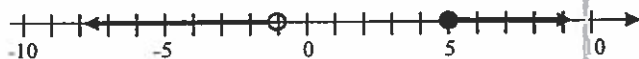
7. If the expression  $\frac{2x}{a} + b = c$  is solved for  $x$  in terms of  $a$ ,  $b$ , and  $c$ , then  $x =$

(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  $x > 5$

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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)  $n + n + 3 \geq 16$

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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.

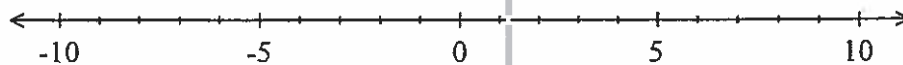
21. Consider the inequality given below.

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

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.

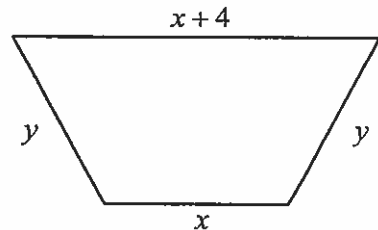
Write an expression for the amount of water remaining in the pool after  $h$ -hours.

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?

$$5(x - 3) = 20$$

$$5x - 15 = 20$$

$$5(x - 3) = 20$$

$$x - 3 = 4$$