

Name Key Class _____ Date _____

Name the property of real numbers illustrated by each equation.

1. $1 = n \cdot 1/n$

Mult. Inverse

2. $a(b + c) = ab + ac$

Distributive

3. $4 \cdot (8x) = 32x$

Distributive

4. $q = q \cdot 2/2$

Mult Identity

5. Every day, a soup kitchen prepares a certain number of servings depending on how many people they expect to show up. What set of numbers best represents the number of meals they prepare each day?

Whole

Write an algebraic expression that models each word phrase.

6. w split evenly 8 ways

$w/8$

7. the product of 11 and the quotient of 4 and a number r

$11(\frac{4}{r}) = 44/r$

8. the quotient of the product of 3 and a number t , and the difference of 5 and a number t

$3t/5-t$

Simplify by combining like terms.

9. $8x + 4y - 3x + 2$

$5x + 4y + 2$

10. $-3 + 2d - 3$

$2d - 6$

11. $2/3p - 4p$

$-\frac{10}{3}p$

12. $9y + 2x - 4(y + x)$

$5y - 2x$

13. $3(r + 5) - 2(2r - 4)$

$-r + 23$

14. $9j - (j - 3j + 8)$

$11j - 8$

Write an algebraic expression to model each situation.

15. You buy bananas at the store for \$2.75 per pound, and you buy apples for \$1.33 per pound. You pay with a \$50 bill. How much change will you receive if you buy b pounds of bananas and a pounds of apples?

$50 - (2.75b + 1.33a)$

Solve each equation.

16. $\frac{12}{x} + 3 = -3$

$$\frac{12}{x} = -6$$

$$12 = -6x$$

$$x = -2$$

17. $\frac{-x}{5} = 2 + x$

$$-\frac{6}{5}x = 2$$

$$x = -\frac{5}{3}$$

18. $2.5y = 15$

$$\frac{5}{2}y = 15$$

$$y = 6$$

19. $5 - w = 4w - 1$

$$w = \frac{6}{5}$$

20. $3(s + 3) = 3s - 0$

$$9 = 0$$

$$NS$$

21. $2(x + 5) - 2(x - 7) = 24$

$$2x + 10 - 2x + 14 = 24$$

$$24 = 24$$

$$\text{All Real \#s}$$

22. $8z + 12 = 5(z - 2)$

$$3z = -22$$

$$z = -\frac{22}{3}$$

23. $7b - 6(11 - 2b) = 10 - 3b$

$$7b - 66 + 12b = 10 - 3b$$

$$22b = 76$$

$$b = \frac{38}{11}$$

24. $10k - 7 = 2(13 - 5k)$

$$20k = 33$$

$$k = \frac{33}{20}$$

Solve each formula for the indicated variable.

25. $F = -k \cdot x$, for k

$$k = -\frac{F}{x}$$

26. $V = \frac{4}{3}\pi r^3 h$, for h

$$h = \frac{3V}{4\pi r^3}$$

27. $F = \frac{G \cdot m_1 \cdot m_2}{d^2}$, for d

$$d^2 = \frac{G \cdot m_1 \cdot m_2}{F}$$

$$d = \pm \sqrt{\frac{G \cdot m_1 \cdot m_2}{F}}$$

Write an inequality that represents the sentence.

28. The distance the product of -12 and a number is away from zero is less than 6.

$$|-12 \cdot x| < 6$$

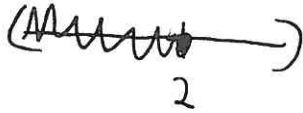
29. The sum of a number and 2 is no less than the sum of the 4 and the product of 9 and the same number.

$$2 + n \geq 4 + 9n$$

Solve each inequality. Graph the solution.

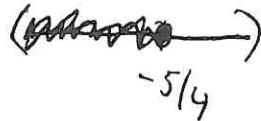
30. $-3x + 7 \geq 1$

$$\begin{aligned} -3x &\geq -6 \\ x &\leq 2 \end{aligned}$$



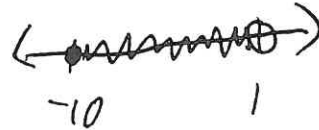
31. $7t + 4 \leq 3t - 1$

$$\begin{aligned} 4t &\leq -5 \\ t &\leq -5/4 \end{aligned}$$



32. $-10 < -2(x+4) \leq 12$

$$\begin{aligned} -2 &< x+4 \leq 6 \\ -6 &< x \leq -10 \end{aligned}$$



Solve the following:

33. $4|2x - 1| - 2 = 10$

$$\begin{aligned} |2x - 1| &= 3 \\ 2x - 1 &= 3 \quad 2x - 1 = -3 \\ x &= 2 \quad x = -1 \\ |4 - 1| &= 3 \quad |1 - 2| = 3 \end{aligned}$$

34. $|5x - 3| = 3x + 4$

$$\begin{aligned} 5x - 3 &= 3x + 4 \quad 5x - 3 = -3x - 4 \\ x &= \frac{7}{2} \quad x = -1/8 \end{aligned}$$

$$\begin{aligned} \left| \frac{35}{2} - 6 \right| &= \left| -\frac{21}{2} + \frac{4}{2} \right| \\ \left| \frac{35}{2} - \frac{24}{2} \right| &= \left| \frac{-3}{2} + \frac{32}{2} \right| \end{aligned}$$

35. $|x| + 10 = 3$

$$\begin{aligned} |x| &= -7 \\ \text{No soln} \end{aligned}$$

Solve each inequality. Graph the solution.

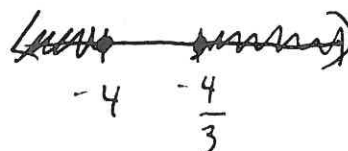
36. $|x + 1| + 3 < -7$

$$|x + 1| < -10$$

No soln

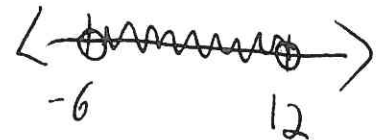
37. $|3t + 8| \geq 4$

$$\begin{aligned} 3t + 8 &\geq 4 \quad 3t + 8 \leq -4 \\ t &\geq -4/3 \quad \text{or} \quad t \leq -4 \end{aligned}$$



38. $|x - 3| < 9$

$$\begin{aligned} x - 3 &< 9 \quad x - 3 > -9 \\ x &< 12 \quad \text{and} \quad x > -6 \end{aligned}$$



39.) Write and solve an absolute value equation that represents the following situation.

"You are 50 miles from the location of the nearest cell phone tower and are driving towards it at 20 miles per hour. You will have cell service when you are within 10 miles of the tower. What are all the times that you will have service if you approach the tower and then drive past?"

$$\begin{aligned} |50 - 20t| &\leq 10 \\ 50 - 20t &\leq 10 \quad 50 - 20t \geq -10 \\ t &\geq 2 \quad \text{and} \quad t \leq 3 \end{aligned}$$

- 40.) Classify the following numbers. R=real Ra=rational I=irrational W=whole N=natural I=integer
- a.) -2
 - b.) $\sqrt[4]{2.25}$
 - c.) $-3\sqrt{121}$
 - d.) -4.4354
 - e.) $e \approx 2.71826 \dots$

R
Ra
I

Ra
Re
 $\sqrt[4]{\frac{9}{2}} = \frac{3}{2}$

Ra
Re
-3 · 11

Ra
Re

Re
I

41.) WRITING: Briefly answer the following.

a.) Explain when a decimal is a real number, when it's a rational number, and when it's an irrational number.

Real → Always

rational → it ends or it repeats

irrational → Doesn't end & doesn't repeat

b.) When do we use AND inequalities when dealing with absolute-value inequalities? When do we use OR inequalities when dealing with absolute-value inequalities?

And - when deal with an absolute value less than ($|x| < 3$)
 Or - when dealing with an absolute value greater than ($|x| > 3$)

c.) What property of the real numbers makes subtraction just another form of addition? What property makes division just another form of multiplication?

Subtraction: Additive inverse: $x + (-x)$, use another #'s inverse

Division: Multiplicative inverse: $x / 3 = x \cdot \frac{1}{3}$ - use another #'s inverse