

Name: KEY

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

Algebra 1: Unit 1 Review

Study Guide

Be able to...

- ✓ Solve and graph multi-step inequalities (Sections 6.1 & 6.2)
- ✓ Solve and graph compound inequalities (Section 6.3)
- ✓ Solve absolute value equations (Section 6.4)
- ✓ Solve absolute value inequalities (Section 6.4)
- ✓ Set up equations and inequalities from real life scenarios (applications)

Solve the following inequalities and graph the solutions.

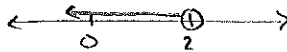
$$1. \begin{array}{r} x + 5 \geq 3 \\ -5 \quad -5 \end{array}$$

$$\boxed{x \geq -2}$$



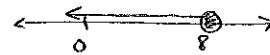
$$2. \begin{array}{r} -2 > x - 4 \\ +4 \quad +4 \end{array}$$

$$\begin{array}{r} 2 > x \\ \boxed{x < 2} \end{array}$$



$$3. \begin{array}{r} n - 5 \leq 3 \\ +5 \quad +5 \end{array}$$

$$\boxed{n \leq 8}$$



$$4. \begin{array}{r} 3 + n > -3 \\ -3 \quad -3 \end{array}$$

$$\boxed{n > -6}$$



$$5. \begin{array}{r} 6 > -3x \\ -3 \quad -3 \end{array}$$

$$\begin{array}{r} -2 < x \\ \boxed{x > -2} \end{array}$$



$$6. \begin{array}{r} -4x + 2 > -18 \\ -2 \quad -2 \end{array}$$

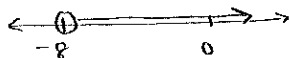
$$\begin{array}{r} -4x > -20 \\ -4 \quad -4 \end{array}$$

$$\boxed{x < 5}$$



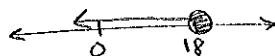
$$7. 4\left(\frac{a}{4}\right) > (-2) 4$$

$$\boxed{a > -8}$$



$$8. \frac{3}{2}\left(\frac{2}{3}x\right) \leq (12)\frac{3}{2}$$

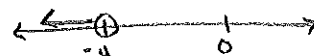
$$\boxed{x \leq 18}$$



$$9. \begin{array}{r} -10 > b - 6 \\ +6 \quad +6 \end{array}$$

$$-4 > b$$

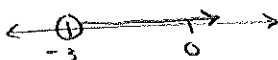
$$\boxed{b < -4}$$



$$10. \begin{array}{r} 5x - 2 > -17 \\ +2 \quad +2 \end{array}$$

$$\frac{5x}{5} > \frac{-15}{5}$$

$$\boxed{x > -3}$$



$$11. \begin{array}{r} -x - 4 \geq 3x - 2 \\ +x \quad +x \end{array}$$

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

$$-2 \geq \frac{4x}{4}$$

$$-\frac{1}{2} \geq x \quad \boxed{x \leq -\frac{1}{2}}$$

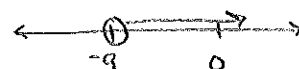


$$12. \begin{array}{r} 12 > -2x - 6 \\ +6 \quad +6 \end{array}$$

$$\frac{18}{-2} > \frac{-2x}{-2}$$

$$-9 < x$$

$$\boxed{x > -9}$$



Solve the following inequalities and graph the solutions.

$$13. -x + 6 > -(2x + 4)$$

$$\begin{array}{r} -x + 6 > -2x - 4 \\ +2x \quad +2x \\ \hline x + 6 > -4 \\ -6 \quad -6 \\ \hline x > -10 \end{array}$$

$$14. \frac{1}{2}x + 3 \leq 7$$

$$\begin{array}{r} \frac{1}{2}x + 3 \leq 7 \\ -3 \quad -3 \\ \hline \frac{1}{2}x \leq 4 \\ \times 2 \\ \hline x \leq 8 \end{array}$$

$$15. 2x - 1 > 6x + 2$$

$$\begin{array}{r} 2x - 1 > 6x + 2 \\ -2x \quad -2x \\ \hline -1 > 4x + 2 \\ -2 \quad -2 \\ \hline -3 > 4x \\ \frac{-3}{4} > \frac{4x}{4} \\ -3/4 > x \end{array}$$

$$x < -3/4$$

$$16. -2x + 2 < -12$$

$$\begin{array}{r} -2x + 2 < -12 \\ -2 \quad -2 \\ \hline -2x < -14 \\ \frac{-2x}{-2} < \frac{-14}{-2} \\ x > 7 \end{array}$$

$$17. 10 - c \geq 6$$

$$\begin{array}{r} 10 - c \geq 6 \\ -10 \quad -10 \\ \hline -c \geq -4 \\ \frac{-c}{-1} \geq \frac{-4}{-1} \\ c \leq 4 \end{array}$$

$$18. \frac{7}{3}x - 1 \geq 6$$

$$\begin{array}{r} \frac{7}{3}x - 1 \geq 6 \\ +1 \quad +1 \\ \hline \frac{7}{3}x \geq 7 \\ \times \frac{3}{7} \\ \hline x \geq 3 \end{array}$$

Write a compound inequality that represents the statement.

19.  $x$  is less than 8 and greater than 2

$$2 < x < 8$$

20.  $x$  is less than  $-1$  and at least  $-5$

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

21.  $x$  is greater than 6 or less than 5

$$x > 6 \text{ or } x < 5$$

Solve the following inequalities and graph the solutions.

$$22. 6 < x - 6 \leq 8$$

$$\begin{array}{r} 6 < x - 6 \leq 8 \\ +6 \quad +6 \quad +6 \\ \hline 12 < x \leq 14 \end{array}$$

$$23. -3x - 7 \geq 8 \text{ or } -2x - 11 \leq -31$$

$$\begin{array}{r} -3x - 7 \geq 8 \\ +7 \quad +7 \\ \hline -3x \geq 15 \\ \frac{-3x}{-3} \geq \frac{15}{-3} \\ x \leq -5 \end{array}$$

$$\begin{array}{r} -2x - 11 \leq -31 \\ +11 \quad +11 \\ \hline -2x \leq -20 \\ \frac{-2x}{-2} \leq \frac{-20}{-2} \\ x \geq 10 \end{array}$$

$$x \leq -5 \text{ or } x \geq 10$$

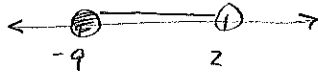


Solve the following inequalities and graph the solutions.

$$24. \frac{-13}{-5} \leq \frac{5}{-5} + \frac{2x}{-5} < \frac{9}{-5}$$

$$\frac{-18}{2} \leq \frac{2x}{2} < \frac{4}{2}$$

$$\boxed{-9 \leq x < 2}$$



$$25. \frac{2x}{-7} + \frac{7}{-7} < \frac{3}{-7} \quad \text{or} \quad \frac{5x}{-5} + \frac{5}{-5} \geq \frac{10}{-5}$$

$$\frac{2x}{2} < \frac{-4}{2} \quad \frac{5x}{5} > \frac{5}{5}$$

$$\boxed{x < -2 \quad \text{or} \quad x > 1}$$



$$26. \frac{-4}{+8} < \frac{4x}{+8} - \frac{8}{+8} < \frac{12}{+8}$$

$$\frac{4}{4} < \frac{4x}{4} < \frac{20}{4}$$

$$\boxed{1 < x < 5}$$



$$27. \frac{-2x}{-2} > \frac{6}{-2} \quad \text{or} \quad \frac{2x}{-1} + \frac{1}{-1} > \frac{5}{-1}$$

$$x < -3 \quad \frac{2x}{2} > \frac{4}{2}$$

$$\boxed{x < -3 \quad \text{or} \quad x > 2}$$



Solve the following absolute value equations.

$$28. |x| = 21$$

$$\boxed{x = -21, 21}$$

$$29. |x + 8| = 9$$

$$\frac{x + 8}{-8} = \frac{9}{-8}$$

$$x = 1$$

$$\frac{x + 8}{-8} = \frac{-9}{-8}$$

$$x = -17$$

$$\boxed{x = -17, 1}$$

$$30. |4x - 2| = 22$$

$$\frac{4x - 2}{+2} = \frac{22}{+2}$$

$$\frac{4x}{4} = \frac{24}{4}$$

$$x = 6$$

$$\frac{4x - 2}{+2} = \frac{-22}{+2}$$

$$\frac{4x}{4} = \frac{-20}{4}$$

$$x = -5$$

$$\boxed{x = -5, 6}$$

$$31. \frac{|7x + 3|}{-2} + \frac{2}{-2} = \frac{33}{-2}$$

$$|7x + 3| = 31$$

$$\frac{7x + 3}{-3} = \frac{31}{-3}$$

$$\frac{7x}{7} = \frac{28}{7}$$

$$x = 4$$

$$\frac{7x + 3}{-3} = \frac{-31}{-3}$$

$$\frac{7x}{7} = \frac{-34}{7}$$

$$x = \frac{-34}{7}$$

$$\boxed{x = \frac{-34}{7}, 4}$$

$> , \geq$  : OR

$< , \leq$  : AND

Solve the following absolute value inequalities and graph the solutions.

32.  $|x + 12| > 36$

$$\begin{array}{r} x + 12 > 36 \\ -12 \quad -12 \\ \hline \end{array}$$

$$x > 24$$

$$\begin{array}{r} x + 12 < -36 \\ -12 \quad -12 \\ \hline \end{array}$$

$$x < -48$$

$$\boxed{x > 24 \text{ or } x < -48}$$



33.  $|x - 3| \leq 17$

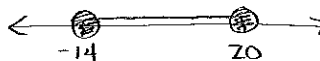
$$\begin{array}{r} x - 3 \leq 17 \\ +3 \quad +3 \\ \hline \end{array}$$

$$x \leq 20$$

$$\begin{array}{r} x - 3 \geq -17 \\ +3 \quad +3 \\ \hline \end{array}$$

$$x \geq -14$$

$$\boxed{-14 \leq x \leq 20}$$



34.  $|x + 2| - 5 > 8$

$$\begin{array}{r} |x + 2| - 5 > 8 \\ +5 \quad +5 \\ \hline |x + 2| > 13 \end{array}$$

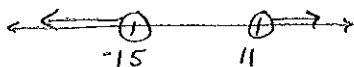
$$\begin{array}{r} x + 2 > 13 \\ -2 \quad -2 \\ \hline \end{array}$$

$$x > 11$$

$$\begin{array}{r} x + 2 < -13 \\ -2 \quad -2 \\ \hline \end{array}$$

$$x < -15$$

$$\boxed{x > 11 \text{ or } x < -15}$$



35.  $|5x + 1| - 8 \leq 16$

$$\begin{array}{r} |5x + 1| - 8 \leq 16 \\ +8 \quad +8 \\ \hline |5x + 1| \leq 24 \end{array}$$

$$\begin{array}{r} 5x + 1 \leq 24 \\ -1 \quad -1 \\ \hline \end{array}$$

$$\frac{5x}{5} \leq \frac{23}{5}$$

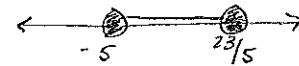
$$x \leq \frac{23}{5}$$

$$\boxed{-5 \leq x \leq \frac{23}{5}}$$

$$\begin{array}{r} 5x + 1 \geq -24 \\ -1 \quad -1 \\ \hline \end{array}$$

$$\frac{5x}{5} \geq \frac{-25}{5}$$

$$x \geq -5$$



36. You are going to a Phillies game this spring. The ticket costs \$31. Popcorn costs \$4.25 per box. You have \$60 in your wallet.

a.) Write an equation that models this scenario.

$$4.25x + 31 = 60$$

b.) Solve the equation. How many boxes of popcorn will you be able to afford if you want to spend all of your money?

$$\begin{array}{r} 4.25x + 31 = 60 \\ -31 \quad -31 \\ \hline \end{array}$$

$$\frac{4.25x}{4.25} = \frac{29}{4.25}$$

$$x = 6.82$$

$$\boxed{6 \text{ boxes}}$$