

**INEQUALITIES TEST REVIEW: UNIT 2 LESSONS 8-13**  
**SHOW ALL WORK FOR EACH PROBLEM.**

**Lesson 8: Inequalities**

Determine if the following inequalities are true or false for the given values of x.

1)  $x^2 + 2x - 9 > -15$  for  $x = -3$  *Substitute*  
 $(-3)^2 + 2(-3) - 9 > -15$   
 $-6 > -15$   
**True**

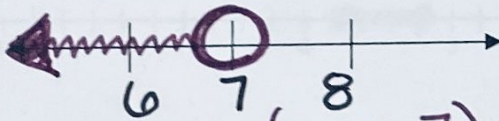
2)  $\frac{4(x-6)}{3} \leq x - 7$  for  $x = 3$  *Substitute*  
 $\frac{4((3)-6)}{3} \leq (3) - 7$   
 $-4 \leq -4$  **True**

\*put each side in calc.!

**Lesson 9: Solving Inequalities**

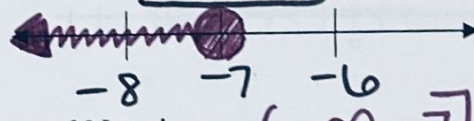
Solve the inequalities and graph their solutions on the number line. Write each solution set in interval notation.

3)  $4x - 8 < 20$   
 $\frac{4x - 8}{+8} < \frac{20}{+8}$   
 $\frac{4x}{4} < \frac{28}{4}$   
 $x < 7$



Interval Notation:  $(-\infty, 7)$

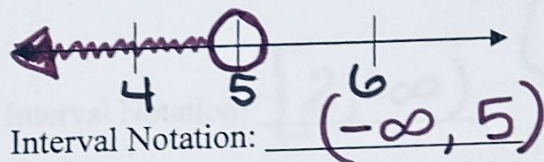
4)  $-2(x + 1) \geq 12$   
 $-2x - 2 \geq 12$   
 $\frac{-2x - 2}{+2} \geq \frac{12}{+2}$   
 $\frac{-2x}{-2} \geq \frac{14}{-2}$   
 $x \leq -7$



Interval Notation:  $(-\infty, -7]$

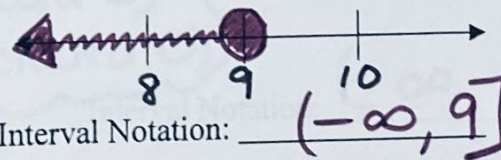
when ÷ by neg., FLIP the inequality!

5)  $6 - 3x > -9$   
 $\frac{6 - 3x}{-6} > \frac{-9}{-6}$   
 $\frac{-3x}{-3} > \frac{-15}{-3}$  *FLIP!*  
 $x < 5$



Interval Notation:  $(-\infty, 5)$

6)  $\frac{2}{3}x + 4 \leq 10$   
 $\frac{\frac{2}{3}x + 4}{-4} \leq \frac{10}{-4}$   
 $(\frac{3}{2}) \frac{2}{3}x \leq 6(\frac{3}{2})$   
 $x \leq 9$



Interval Notation:  $(-\infty, 9]$

coefficient To cancel a fraction, multiply by the reciprocal! (flip fraction)

7) Which value of x is in the solution set of the inequality  $-2x + 5 > 17$ ?

- 1) -8      2) -6      3) -4      4) 12

$\frac{-2x + 5}{-5} > \frac{17}{-5}$   
 $\frac{-2x}{-2} > \frac{12}{-2}$   
 $x < -6$

\*choose the number that is LESS THAN -6!

**Lesson 10/11: Compound Inequalities**

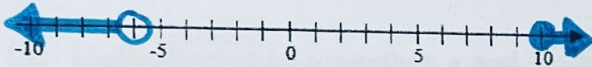
Solve the following compound inequalities, graph the solution set on the number line. For 9 & 10 write your answer as a single inequality. (AND only)

8)  $3x + 7 < -11$  or  $4 - 2x \leq -16$

$$\frac{3x + 7}{-7} < \frac{-11}{-7} \quad \text{or} \quad \frac{4 - 2x}{-4} \leq \frac{-16}{-4}$$

$$\frac{3x}{3} < \frac{-18}{3} \quad \frac{-2x}{-2} \leq \frac{-20}{-2} \quad \leftarrow \text{FLIP}$$

$$x < -6 \quad \text{OR} \quad x \geq 10$$

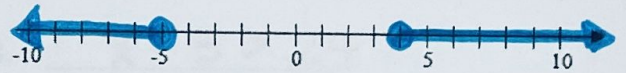


9)  $-10x + 3 \leq -37$  or  $3x - 10 \leq -25$

$$\frac{-10x + 3}{-3} \leq \frac{-37}{-3} \quad \text{or} \quad \frac{3x - 10}{+10} \leq \frac{-25}{+10}$$

$$\frac{-10x}{-10} \leq \frac{-40}{-10} \quad \frac{3x}{3} \leq \frac{-15}{3}$$

$$x \geq 4 \quad \text{OR} \quad x \leq -5$$



10)  $3x - 7 \geq -1$  and  $3x - 7 \leq 7$

$$\frac{3x - 7}{+5} \geq \frac{-1}{+5} \quad \text{and} \quad \frac{3x - 7}{+5} \leq \frac{7}{+5}$$

$$\frac{3x}{3} \geq \frac{4}{3} \quad \frac{3x}{3} \leq \frac{12}{3}$$

$$x \geq \frac{4}{3} \quad x \leq 4$$

$$\frac{4}{3} \leq x \leq 4$$



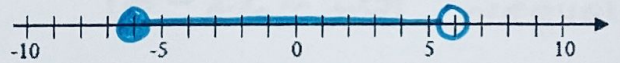
Single Inequality:  $\frac{4}{3} \leq x \leq 4$

11)  $-2 \leq \frac{1}{2}x + 1 < 4$

$$\frac{1}{2}x + 1 \geq -2 \quad \frac{1}{2}x + 1 < 4$$

$$\frac{1}{2}x \geq -3 \quad \frac{1}{2}x < 3$$

$$x \geq -6 \quad x < 6$$



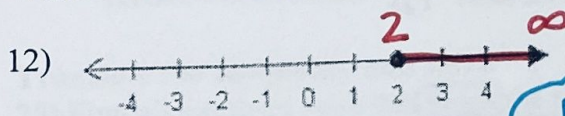
Single Inequality:  $-6 \leq x < 6$

Mr. Not Included  $( )$

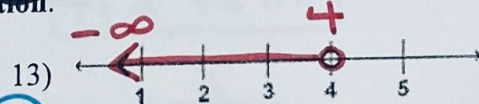
Mr. Includes  $[ ]$

**Lesson 12: Interval Notation**

Write solution sets for the following using interval notation.

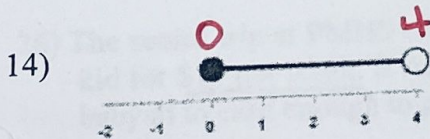


Interval Notation:  $[2, \infty)$

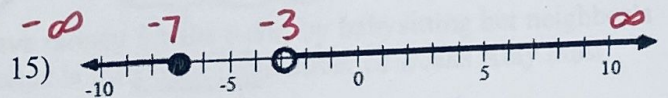


Interval Notation:  $(-\infty, 4)$

[included ●]  
(not included ○)



Interval Notation:  $[0, 4]$



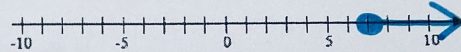
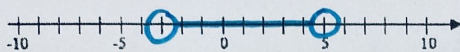
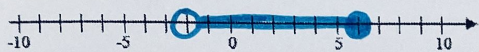
Interval Notation:  $(-\infty, -7] \text{ OR } (-3, \infty)$

For #16-18, Graph each on a number line & identify the solution set as an inequality:

16)  $(-2, 6]$

17)  $(-3, 5)$

18)  $[7, \infty)$



Solution Set:  $-2 < x \leq 6$

Solution Set:  $-3 < x < 5$

Solution Set:  $x \geq 7$

**Lesson 13: Modeling with Inequalities**

19) The difference of a number,  $x$  and 3 is more than 24.

$x - 3 > 24$

20) Four times a number,  $x$  plus nine is at most 30.

$4x + 9 \leq 30$

21) The sum of  $5x$  and  $2x$  is no more than 5.

$5x + 2x \leq 5$

22) The minimum value of  $-5x + 6$  is 8.

$-5x + 6 \geq 8$

23) Suppose you had  $d$  dollars in your bank account. You spent \$22 but have at least \$28 left. Which inequality represents the how much money you had initially.

$d - 22 \geq 28$  *you have more than or equal to 28!*

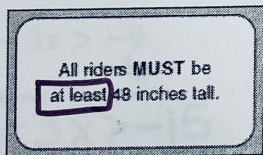
(1)  $d - 22 > 28$

(3)  $d + 22 \geq 28$

(2)  $d + 22 \leq 28$

(4)  $d - 22 \geq 28$

24) The sign shown below is posted in front of a roller coaster ride at the Wadsworth County Fairgrounds.



If  $h$  represents the height of a rider in inches, what is a correct translation of the statement on this sign?

"at least"  $\rightarrow \geq$

$h \geq 48 \text{ in.}$

**Translate the inequality and solve.**

25) Find all numbers such that twice the sum of the number and eight is at most four.

$$\begin{aligned} 2(n+8) &\leq 4 \\ 2n+16 &\leq 4 \\ \underline{-16} &\quad \underline{-16} \\ 2n &\leq -12 \end{aligned}$$

$$\begin{aligned} \frac{2n}{2} &\leq \frac{-12}{2} \\ n &\leq -6 \end{aligned}$$

26) The senior trip at PMHS cost \$190. Amy is going to save money for the ticket by babysitting her neighbor's kid for \$12 per week. If Amy already has saved \$32, what is the minimum number of weeks Amy must babysit to earn enough to pay for the senior trip?

$$\begin{aligned} 12w + 32 &\geq 190 \\ \underline{-32} &\quad \underline{-32} \\ 12w &\geq 158 \\ \underline{12} &\quad \underline{12} \\ w &\geq 13.\bar{16} \end{aligned}$$

She must work for 14 weeks to have enough money!