Homework 1.7: Absolute Value Inequalities

Name: Key!

Math 3

Solve and then graph the following inequalities:

1. $|2x-5|+2 \leq 13$ $|2x-5| \leq 11$

$2x-5 \leq 11$ $2x-5 \geq -11$

$2x \leq 16$ $2x \geq -6$

$x \leq 8$ $x \geq -3$

$[-3, 8]$

2. $|6-3x| < 15$

$6-3x < 15$ $6-3x > -15$

$-3x < 9$ $-3x > -21$

$x > -3$ $x < 7$

$(-3, 7)$

3. $|5-x|+4 \leq 9$ $|5-x| \leq 5$

$5-x \leq 5$ $5-x \geq -5$

$-x \leq 0$ $-x \geq -10$

$x \geq 0$ $x \leq 10$

$[0, 10]$

4. $|11-2x|-6 > 11$ $|11-2x| > 17$

$11-2x > 17$ $11-2x < -17$

$-2x > 6$ $-2x < -28$

$x < -3$ $x > 14$

$(-\infty, -3) \cup (14, \infty)$

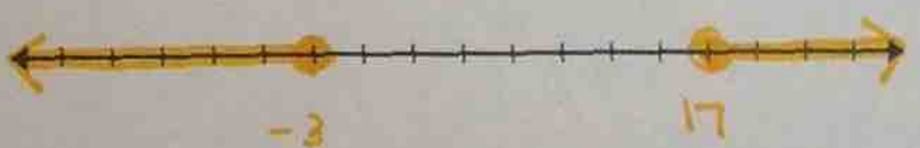
5. $|7-x|+2 \geq 12$

$7-x \geq 10$ $7-x \leq -10$

$-x \geq 3$ $-x \leq -17$

$x \leq -3$ $x \geq 17$

$(-\infty, -3] \cup [17, \infty)$



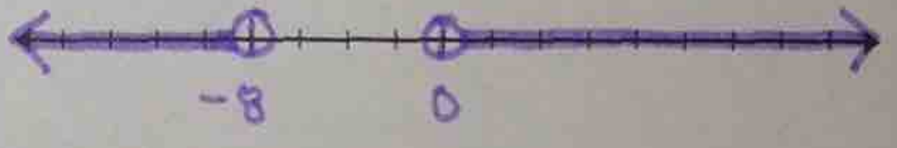
6. $9-|x+4| < 5$ $-1|x+4| < -4$

$|x+4| > 4$

$x+4 > 4$ $x+4 < -4$

$x > 0$ $x < -8$

$(-\infty, -8) \cup (0, \infty)$



7. Which of the following is the inequality of the graph below?

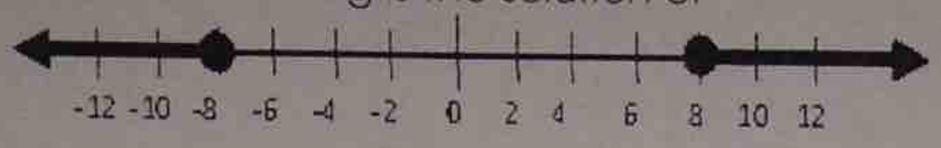
a. $|3-2x| \geq 3$

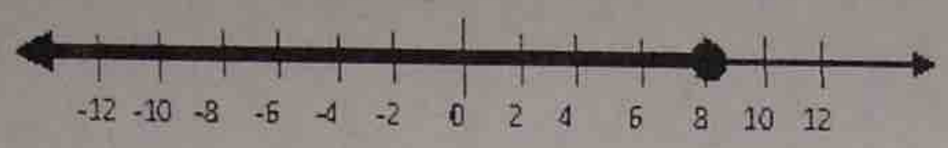
b. $|3-2x| > 3$

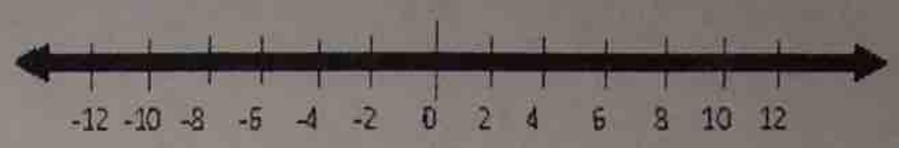
c. $|3-2x| \leq 3$

d. $|3-2x| < 3$

8. Which of the following is the solution of $\left|\frac{3}{4}x-3\right|-8\geq -5$?

a. 

b. 

c. 

d. 

$\frac{3}{4}x-3\geq 3$

$\frac{3}{4}x\geq 6$

$3x\geq 24$ $\quad x\geq 8$

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

$\frac{3x}{4}\leq 0$

$3x\leq 0$

$x\leq 0$

1. The weight of a 40 lb bag of fertilizer varies as much as 4 oz from the stated weight. Write an absolute value inequality and a compound inequality for the weight, *w*, of a bag of fertilizer.

$|\text{Actual}-\text{Ideal}|\leq \text{tolerance}$

$|x-40|\leq 4$ $\quad x-40\leq 4$ $\quad x\leq 44$ $\quad x-40\geq -4$ $\quad x\geq 36$

weight is between 36 lbs and 44 lbs.

2. Write an absolute value inequality and a compound inequality for the temperature, *t*, that was recorded to be as low as 65° F and as high as 87° F on a certain day.

$\text{Ideal}=\frac{87+65}{2}, 76$

$|x-76|\leq 11$

$\text{Tolerance}=\frac{87-65}{2}=\frac{22}{2}=11$

3. The duration of a telephone call to a software company's help desk is at least 2.5 minutes and at most 25 minutes. Write an absolute value inequality and a compound inequality for the duration, *d*, of a telephone call.

$\text{Ideal}=\frac{25+2.5}{2}=\frac{27.5}{2}=13.75$

$|x-13.75|\leq 11.25$

$\text{Tolerance}=\frac{25-2.5}{2}=11.25$

4. The circumference, *c*, of basketball for woman must be between 28.5 and 29 inches. Write an absolute value inequality and a compound inequality for the circumference.

$\text{Ideal}=\frac{28.5+29}{2}=28.75$

$|x-28.75|\leq 0.25$

$\text{Tolerance}=\frac{29-28.5}{2}=0.25$