

# Solving Absolute Value Inequalities HW

Name Master E  
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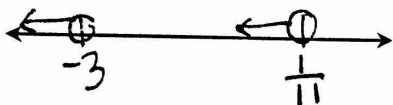
Solve each absolute value inequality. Graph the solution set and state it using set builder notation.

1.  $|4x-5|+4 > 7x+8$

$|4x-5| > 7x+4$  OR

$4x-5 > 7x+4$   
 $-5 > 3x+4$   
 $-9 > 3x$   
 $-3 > x$

$4x-5 < -7x-4$   
 $11x-5 < -4$   
 $11x < 1$   
 $x < \frac{1}{11}$



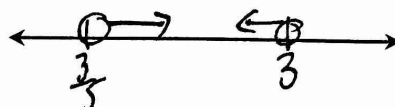
FA:  $x < \frac{1}{11}$

2.  $7+|9-5x| > 1$

$|9-5x| > -6$  OR

$9-5x > -6$   
 $-5x > -15$   
 $x < 3$

$9-5x < 6$   
 $-5x < -3$   
 $x > \frac{3}{5}$



FA:  $\mathbb{R}$

3.  $-|x-7|+5 \geq 3x-2$

$-|x-7| \geq 3x-7$

$|x-7| \leq -3x+7$  AND

$x-7 \leq -3x+7$      $x-7 \geq 3x-7$   
 $4x \leq 14$              $-7 \geq 2x-7$   
 $x \leq \frac{14}{4}$              $0 \geq 2x$   
 $x \leq \frac{7}{2}$              $0 \geq x$

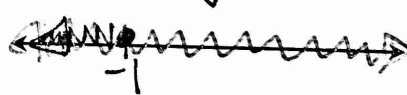


FA:  $x \leq 0$

4.  $|x+2|-x \geq 0$

$|x+2| \geq x$  OR

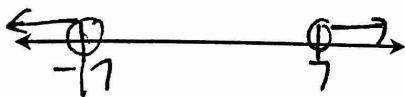
$x+2 \geq x$      $x+2 \leq -x$   
 $2 \geq 0$              $2 \leq -2x$   
 $\mathbb{R}$                      $-1 \geq x$



*x+2 will always be greater than x!*

5.  $|x+5| > 12$  OR

$x+5 > 12$      $x+5 < -12$   
 $x > 7$              $x < -17$



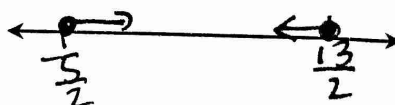
FA:  $x < -17$  or  $x > 7$

6.  $3|2x-4|-6 \leq 21$

$3|2x-4| \leq 27$  AND

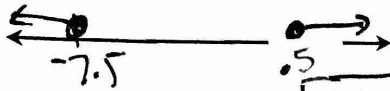
$|2x-4| \leq 9$

$2x-4 \leq 9$      $2x-4 \geq -9$   
 $2x \leq 13$              $2x \geq -5$   
 $x \leq \frac{13}{2}$              $x \geq -\frac{5}{2}$



FA:  $-\frac{5}{2} \leq x \leq \frac{13}{2}$

7.  $-2|8x+28|+4 \leq -60$   
 $-2|8x+28| \leq -64$   
 $|8x+28| \geq 32$  OR  
 $8x+28 \geq 32$      $8x+28 \leq -32$   
 $8x \geq 4$          $8x \leq -60$   
 $x \geq .5$           $x \leq -7.5$



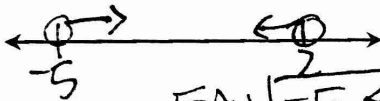
FA:  $x \leq -7.5$  or  $x \geq .5$

8.  $2|5x+1|+9 > 3$   
 $2|5x+1| > -6$   
 $|5x+1| > -3$



FA:  $\mathbb{R}$

9.  $-3|-2x-3|+5 > -16$   
 $-3|-2x-3| > -21$  AND  
 $|-2x-3| < 7$   
 $-2x-3 < 7$      $-2x-3 > -7$   
 $-2x < 10$      $-2x > -4$   
 $x > -5$          $x < 2$



FA:  $-5 < x < 2$

10.  $-2|\frac{4}{3}x-5|-7 \geq 19$   
 $-2|\frac{4}{3}x-5| \geq 26$   
 $|\frac{4}{3}x-5| \leq -13$

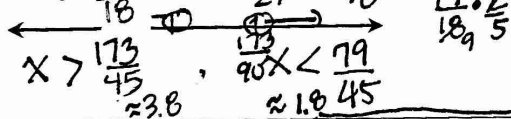
*No work is nec. at this point!*



FA:  $\emptyset$

11.  $6|\frac{5}{2}x-7|-\frac{2}{3} > 15$      $15+\frac{2}{3} = \frac{45}{3}+\frac{2}{3}$   
 $6|\frac{5}{2}x-7| > \frac{47}{3}$   
 $|\frac{5}{2}x-7| > \frac{47}{18}$  OR  $\frac{47}{18} + \frac{126}{18}$   
 $\frac{5}{2}x-7 > \frac{47}{18}$      $\frac{5}{2}x-7 < \frac{47}{18}$   
 $5x > \frac{173}{18}$      $\frac{5}{2}x < \frac{79}{18}$   
 $x > \frac{173}{45} \approx 3.8$      $\frac{79}{90}x < \frac{79}{45} \approx 1.8$

$\frac{47}{18} + 7 = \frac{47}{18} + \frac{126}{18}$

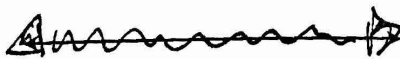


12.  $-4|-2x+5|-9 \leq 12$   
 $-4|-2x+5| \leq 21$   
 $|-2x+5| \geq -\frac{21}{4}$   
 $-2x+5 \geq -\frac{21}{4}$



FA:  $\mathbb{R}$

13.  $|8x+3|+17 \geq 11$     FA:  $x < \frac{19}{45}$  or  $x > \frac{173}{45}$   
 $|8x+3| \geq -6$   
*or in dec. form*  
 $x < 1.8$  or  $x > 3.8$



FA:  $\mathbb{R}$

14. For a door to meet specifications at a carpentry shop, the width must be within  $\frac{1}{4}$  inch of the expected width of the door. The shop gets an order for doors that are  $4\frac{1}{2}$  feet wide. Which of the following is an inequality that expresses the range of widths for acceptable doors?

- A.  $|x+54| \leq \frac{1}{4}$
- B.  $|x+\frac{1}{4}| \leq 4\frac{1}{2}$
- C.  $|x-54| \leq \frac{1}{4}$
- D.  $|x-4\frac{1}{2}| \leq \frac{1}{4}$

$4\frac{1}{2}$  feet = 54 inches

The difference between the ordered door width & the actual width must be less than or equal to  $\frac{1}{4}$ "