

LESSON 2-8 **Practice B**
Solving Absolute-Value Equations and Inequalities

Solve each equation.

$2x+1=7$
 $2x=6$
 $x=3$

$2x-5=5$
 $2x=10$
 $x=5$

1. $|2x+1|=7$ $2x+1=-7$ $2x=-8$ $x=-4$
 $x=3, x=-4$

2. $|-7x|=28$ $-7x=28$ $x=-4$
 $-7x=-28$ $x=4$
 $x=4, x=-4$

4. $|2x-5|=5$ $2x-5=5$ $2x=10$ $x=5$
 $2x-5=-5$ $2x=0$ $x=0$
 $x=5, x=0$

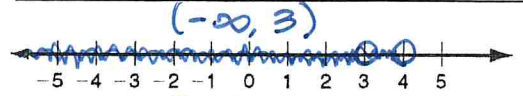
5. $2|x+1|=14$ $|x+1|=7$ $x+1=7$ $x=6$
 $|x+1|=7$ $x+1=-7$ $x=-8$
 $x=6, x=-8$

3. $3|3x|-7=2$ $3|3x|=9$ $|3x|=3$
 $3x=3$ $3x=-3$
 $x=1, x=-1$

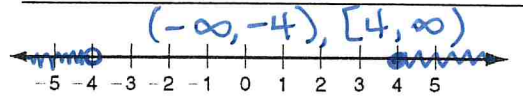
6. $|4-x|+2=9$ $|4-x|=7$ $4-x=7$ $4-x=-7$
 $4-x=7$ $4-x=-7$
 $-x=3$ $-x=-11$
 $x=-3, x=11$

Solve each inequality or compound inequality. Then graph the solution.

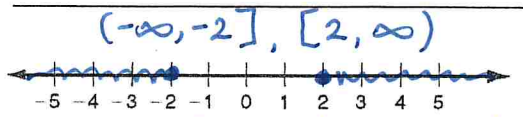
7. $-4x+2 > -10$ and $5x-12 < 8$
 $-4x > -12$ $5x < 20$
 $x < 3$ $x < 4$



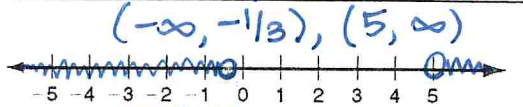
8. $3x-4 \geq 8$ or $-x+12 > 16$
 $3x \geq 12$ $-x > 4$
 $x \geq 4$ $x < -4$



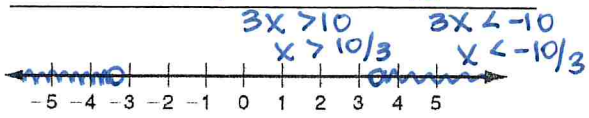
9. $|9x| \geq 18$
OR $9x \geq 18$ $9x \leq -18$
OR $x \geq 2$ $x \leq -2$



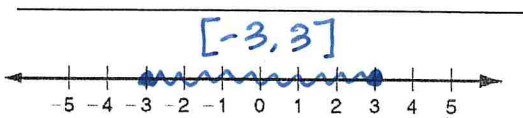
10. $|3x-7| \geq 8$
OR $3x-7 > 8$ $3x-7 < -8$
OR $3x > 15$ $3x < -1$
 $x > 5$ $x < -1/3$



11. $|0.3x| \geq 1$
OR $0.3x > 1$ $0.3x < -1$
OR $\frac{3}{10}x > 1$ $\frac{3}{10}x < -1$



12. $|7x-12| \leq 9$ AND $7x \leq 21$ $7x \geq -21$
 $17x \leq 21$ $x \leq 3$ $x \geq -3$



Solve. $(-\infty, -10/3) \cup (10/3, \infty)$

13. Any measurement is accurate within ± 0.5 of the measurement unit. For example, if you measure your pencil to the nearest inch, your measurement could be 0.5 inch too long or 0.5 inch too short. Write an absolute-value inequality that shows the maximum and minimum actual measure of a nail measured to be 4.4 centimeters to the nearest 0.1 centimeter.

LESSON
2-8

Practice C
Solving Absolute-Value Equations and Inequalities

Solve each equation.

1. $|2x - 3| = 15$

$$\begin{array}{l} 2x - 3 = 15 \quad 2x - 3 = -15 \\ 2x = 18 \quad 2x = -12 \\ \hline x = 9 \quad x = -6 \end{array}$$

2. $\frac{1}{2}|x + 9| = 1$

$$\begin{array}{l} |x + 9| = 2 \\ x + 9 = 2 \quad x + 9 = -2 \\ \hline x = -7 \quad x = -11 \end{array}$$

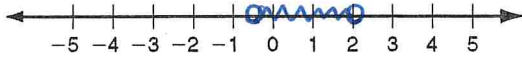
3. $11 - |4 - x| = 4$

$$\begin{array}{l} -|4 - x| = -7 \quad |4 - x| = 7 \\ 4 - x = 7 \quad 4 - x = -7 \\ -x = 3 \quad -x = -11 \\ \hline x = -3 \quad x = 11 \end{array}$$

Solve and graph.

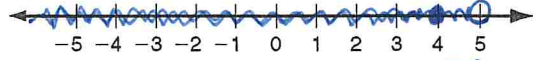
4. $5(7 - 2x) < 40$ and $5x + 2 < 12$

$$\begin{array}{l} 35 - 10x < 40 \quad 5x < 10 \\ -10x < 5 \quad x < 2 \\ \hline x > -1/2 \quad (-1/2, 2) \end{array}$$



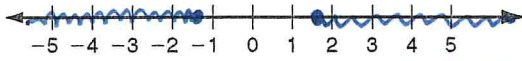
5. $\frac{7x - 10}{6} \leq 3$ or $3x + 2 > 5x - 8$

$$\begin{array}{l} 7x - 10 \leq 18 \quad -2x + 2 > -8 \\ 7x \leq 28 \quad -2x > -10 \\ \hline x \leq 4 \quad x < 5 \quad (-\infty, 5) \end{array}$$



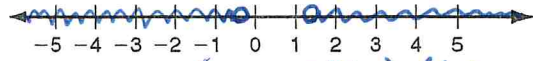
6. $\frac{4x - 1}{6} \geq 1$ or $\frac{4x - 1}{6} \leq -1$

$$\begin{array}{l} 4x - 1 \geq 6 \quad 4x - 1 \leq -6 \\ 4x \geq 7 \quad 4x \leq -5 \\ \hline x \geq 7/4 \quad x \leq -5/4 \end{array}$$



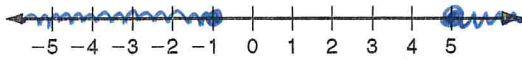
7. $-3|5x - 2| < -12$

$$\begin{array}{l} |5x - 2| > 4 \\ 5x - 2 > 4 \quad 5x - 2 < -4 \\ 5x > 6 \quad 5x < -2 \\ \hline x > 6/5 \quad x < -2/5 \end{array}$$



8. $2|3x - 6| + 6 \geq 24$

$$\begin{array}{l} 2|3x - 6| \geq 18 \quad 3x - 6 \geq 9 \quad 3x - 6 \leq -9 \\ |3x - 6| \geq 9 \quad 3x \geq 15 \quad 3x \leq -3 \\ \hline x \geq 5 \quad x \leq -1 \end{array}$$



9. $\frac{|9x + 1|}{4} < 2$

$$\begin{array}{l} |9x + 1| < 8 \quad 9x + 1 < 8 \quad 9x + 1 > -8 \\ 9x < 7 \quad 9x > -9 \\ \hline x < 7/9 \quad x > -1 \end{array}$$



Solve.

$(-\infty, -1], [5, \infty)$

$(-1, 7/9)$

10. Ben says that there is no solution for this absolute-value inequality. Is he correct? If not, solve the inequality. Explain how you know you are correct.

$$32 + \frac{|x - 7|}{13} < 7$$

$$\frac{|x - 7|}{13} < -25$$

$$|x - 7| < -325$$

He is correct

$$|x| < -\# \Rightarrow \emptyset$$

Chapter 2 Extra Practice Problems

x. A photographer hiked through the Grand Canyon. Each day she filled a photo memory card with images. When she returned from the trip, she deleted some photos, saving only the best. The table shows the number of photos she kept from all those taken for each memory card.

Grand Canyon Photos	
Photos Taken	Photos Kept
117	25
128	31
140	39
157	52
110	21
188	45
170	42

a. Find the correlation coefficient. $r \approx 0.848$

b. Write the equation of the line of best fit.

$y = 0.331x - 11.326$

c. Predict the number of photos this photographer will keep if she takes 200 photos. How many will take if she keeps 25 photos.

$x \rightarrow y = 54.868 \approx 55$ kept
 $y \rightarrow x = 109.755 \approx 110$ taken

d. Interpret the slope using correct units.

$m = \frac{0.331}{1x}$ On avg, as the # of photos taken increases by 1, the # of photos kept increases by 0.331.

Ex. Find the equation of the line:

a) given $f(2) = -2$ and $f(3) = -4$ $m = \frac{-4 - (-2)}{3 - 2} = \frac{-2}{1} = -2$ b) Parallel to $x = 7.2$ thru $(2, 8)$

$y + 2 = -2(x - 2) \rightarrow y + 2 = -2x + 4$

c) Perpendicular to $2x - 3y = 6$ thru $(2, 1)$ $y = -2x + 2$

$-3y = 6 - 2x \rightarrow y - 1 = -\frac{3}{2}(x - 2)$

$y = \frac{3}{2}x - 2$ $y - 1 = -\frac{3}{2}x + 3$

$m = -\frac{3}{2}$

Ex. Solve for x.

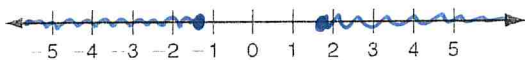
$y = -\frac{3}{2}x + 4$

a) $7t + 6 - 2\left(5 + \frac{3t}{2}\right) = 5t - 11$
 $7t + 6 - 10 - 3t = 5t - 11$
 $4t - 4 = 5t - 11$

c) $\frac{5}{v+6} = \frac{4}{12}$ $-t = -7$ $t = 7$
 $60 = 4v + 24$ $v = 9$
 $36 = 4v$

Ex. Solve for x. Write your answer in interval notation and graph your solution.

a) $\frac{4x-1}{6} \geq 1$ or $\frac{4x-1}{6} \leq -1$
 $4x-1 \geq 6$ $4x-1 \leq -6$
 $4x \geq 7$ $4x \leq -5$
 $x \geq \frac{7}{4}$ $x \leq -\frac{5}{4}$

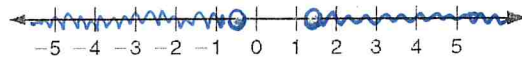


$(-\infty, -\frac{5}{4}] \cup [\frac{7}{4}, \infty)$

b) $3|3x+4| - 7 = 2$
 $3|3x+4| = 9$
 $|3x+4| = 3$

$3x+4 = 3$ $3x+4 = -3$
 $3x = -1$ $3x = -7$
 $x = -\frac{1}{3}$ $x = -\frac{7}{3}$

b) $-3|5x-2| < -12$ $5x-2 > 4$ $5x-2 < -4$
 $|5x-2| > 4$ $5x > 6$ $5x < -2$
 $x > \frac{6}{5}$ $x < -\frac{2}{5}$



$(-\infty, -\frac{2}{5}) \cup (\frac{6}{5}, \infty)$



1

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