

Solve each of the following.

1. $|x| = 3 \quad x = \pm 3$

2. $|x| = -4 \rightarrow$ 'distance from 0 is -4'
 - absolute value \neq negative \rightarrow no solution

3. $|x+2| = 1 \quad x = -1, -3$

$x+2 = 1$	$x+2 = -1$
$x = -1$	$x = -3$

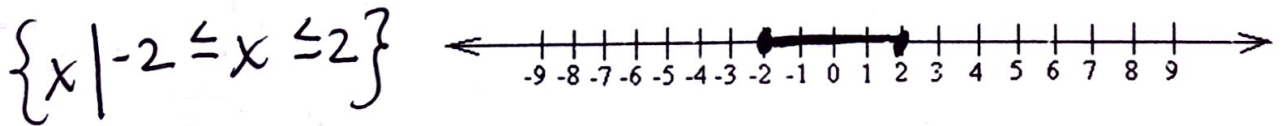
4. $|x-5| = -2$
 abs. value / positive \neq negative \rightarrow no solution

5. $|x+1| - 3 = 4$
 $|x+1| = 7 \rightarrow x+1 = 7 \quad \boxed{x = 6}$
 $x+1 = -7 \quad \boxed{x = -8}$

6. $|x-6| + 5 = 2$
 $|x-6| = -3$, pos. \neq neg. \rightarrow no solution

$\leq <$ Conjunction
 LESS THAN AND

7. On the number line, shade all values of x that make $|x| \leq 2$ true.



$\geq >$
 GREATER OR Disjunction
 =

8. On the number line, shade all values of x that make $|x| \geq 2$ true.

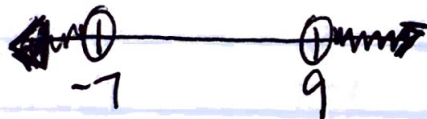


$\{x \mid x \leq -2 \text{ or } x \geq 2\}$
 \cup

EXAMPLES: solve.

① $|x-1| > 8$

$$\begin{array}{l} x-1 > 8 \quad \text{OR} \quad x-1 < -8 \\ +1 \quad +1 \quad \quad \quad +1 \quad +1 \\ \left\{ x \mid x > 9 \quad \text{OR} \quad x < -7 \right\} \end{array}$$

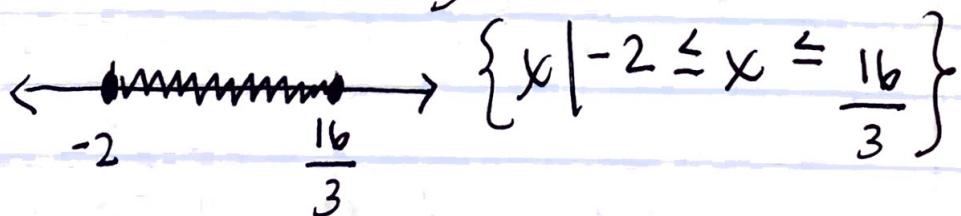


should go apart!

② $|5-3x| \leq 11$

$$\begin{array}{l} 5-3x \leq 11 \quad \text{and} \quad 5-3x \geq -11 \\ -5 \quad \quad -5 \quad \quad -5 \quad \quad -5 \\ \frac{-3x \leq 6}{-3} \quad \quad \quad \frac{-3x \geq -16}{-3} \end{array} \left\{ \begin{array}{l} - \text{isolate?} \\ - \text{and vs. or} \\ - \text{split} \\ - \text{solve} \\ - \text{graph} \end{array} \right.$$

$x \geq -2 \quad \text{and} \quad x \leq \frac{16}{3}$



3

$$|3x+2| - 5 \leq 8$$

$$|3x+2| \leq 13 \quad \text{Isolate } | \quad \text{then split!!}$$

$$3x+2 \leq 13 \quad \text{and} \quad 3x+2 \geq -13$$

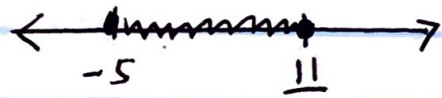
$$3x \leq 11$$

$$3x \geq -15$$

$$x \leq \frac{11}{3} \quad \text{and}$$

$$x \geq -5$$

$$\left\{ x \mid -5 \leq x \leq \frac{11}{3} \right\}$$



4

$$4 - |3k+1| < 2$$

ISOLATE!

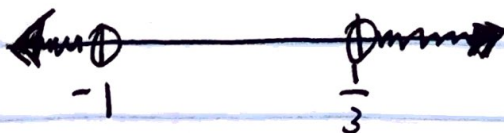
$$-|3k+1| < -2$$

$$|3k+1| > 2 \quad \text{OR} \quad \text{SPLIT!}$$

$$3k+1 > 2 \quad \text{OR} \quad 3k+1 < -2$$

$$3k > 1 \quad \text{OR} \quad 3k < -3$$

$$\left\{ k \mid k > \frac{1}{3} \quad \text{OR} \quad k < -1 \right\}$$



⑤ $\left| \frac{2x-4}{5} \right| - 6 \leq 4$

THINK!

⑥ $|3x-2| \leq -1$

+ \leq - not possible

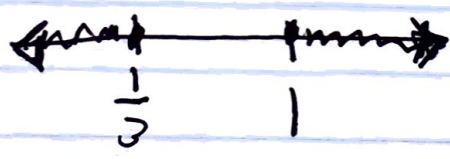
no solution

'AND' looks like 'OR'

$3x-2 \leq -1$ and $3x-2 \geq 1$

$3x \leq 1$ $3x \geq 3$

$x \leq \frac{1}{3}$ and $x \geq 1$



Honors Math 3

Unit 1 - Day 5 Homework

Please do your work on a separate sheet of paper. You must show ALL work and attempt ALL problems to receive full credit. Please check your answers BEFORE class!

p.74 #1-11 odd

AND \leq / OR \geq

Express each open sentence as an equivalent conjunction or disjunction without absolute value.

Sample 1 $|3t - 1| > 2$

Solution $3t - 1 < -2$ or $3t - 1 > 2$

$3t - 1 > 2$ OR $3t - 1 < -2$

- 1. $|x| \leq 3$
- 2. $|t| = 2$
- 3. $|z| > 0$
- 4. $|y - 3| \leq 2$
- 5. $|s + 3| = 3$
- 6. $|2x - 3| \geq 1$
- 7. $|3t - 1| \leq 2$
- 8. $|5 - 2z| < 3$

Express each conjunction or disjunction as an equivalent open sentence involving absolute value.

Sample 2 $-1 \leq x - 2 \leq 1$

Solution $|x - 2| \leq 1$

- 9. $u = -3$ or $u = 3$
- 10. $t \geq -3$ and $t \leq 3$
- 11. $3 > 4(x - 1) > -3$

$|t| \leq 3$

p.75 #9-27 odd

Solve and graph the solution set.

9. $|2t + 5| < 3$

11. $|2u - 5| = 0$

13. $|1 - \frac{x}{3}| \geq \frac{2}{3}$

15. $0 \leq |4u - 7|$

17. $|\frac{t-2}{4}| \leq \frac{1}{2}$

ISOLATE!

Solve.

19. $|x + 5| - 3 = 1$

21. $|2u - 1| + 3 \leq 6$

23. $7 - 3|4d - 7| \geq 4$

25. $4 + 2|\frac{3t-5}{2}| > 5$

27. $7 + 5|c| \leq 1 - 3|c|$

29. On a sheet of graph paper, graph $f(x) = -2|\frac{1}{2}x - 1| + 5$