

SOLVING ABSOLUTE VALUE EQUATIONS

Absolute Value means "distance from zero". When you solve an equation with absolute value, there are two conditions to consider.

Steps to Solving:

- 1) Isolate the absolute value expression. (the part inside the | |)
- 2) Set the absolute value expression equal to the positive and negative value of the number shown.
- 3) Solve each equation
- 4) Circle your answers

$$|x| = 6$$

$x = 6$ $x = -6$

$$|4x| = 12$$

$4x = 12$ $4x = -12$
 $x = 3$ $x = -3$

$$|x + 2| = 8$$

$x + 2 = 8$ $x + 2 = -8$
 $x = 6$ $x = -10$

$$|x-7| + 2 = 10$$

$|x-7| = 8$
 $x-7 = 8$ $x-7 = -8$
 $+7$ $+7$
 $x = 15$ $x = -1$

$$2|x-3| = 18$$

$\frac{2}{2}$ $\frac{18}{2}$
 $|x-3| = 9$
 $x-3 = 9$ $x-3 = -9$
 $x = 12$ $x = -6$

Absolute Value Equations - HW

Solve each equation.

1) $|x| = 9$

$x = -9 \quad x = 9$

2) $|x| = 4$

$x = -4 \quad x = 4$

3) $|n| = 10$

$n = 10 \quad n = -10$

4) $|a| = 7$

$a = -7 \quad a = 7$

5) $|-10r| = 20$

$r = -2 \quad r = 2$

6) $|-6+k| = 16$

$k = -10 \quad k = 22$

7) $\left|\frac{n}{10}\right| = 3$

8) $|-10m| = 50$

$m = -5 \quad m = 5$

10 $\frac{n}{10} = 3 \cdot 10$ ~~$\frac{n}{10} = 3 \cdot 10$~~

$n = -30 \quad n = 30$

9) $|9+r| = 14$

$r = -23 \quad r = 5$

10) $|10r-1| = 71$

$r = 7.2 \quad r = -7$

$$10r - 1 = 71$$

$$\frac{+1}{+1} \quad \frac{+1}{+1}$$

$$10r = 72$$

$$r = 7.2$$

$$11) |7b - 9| = 12$$

$$b = 3 \quad b = -\frac{3}{7}$$

$$\begin{array}{r} 7b - 9 = 12 \\ +9 \quad +9 \\ \hline 7b = 21 \end{array} \quad \begin{array}{r} 7b - 9 = -12 \\ +9 \quad +9 \\ \hline 7b = -3 \end{array}$$

$$\frac{7b = 21}{7} \quad b = 3 \quad \frac{7b = -3}{7} \quad b = -\frac{3}{7}$$

$$13) \frac{-9|x|}{-9} = \frac{-36}{-9}$$

$$x = -4 \quad x = 4$$

$$|x| = 4$$

$$x = 4 \quad x = -4$$

$$15) 8|p - 6| = 72$$

$$p = -3 \quad p = 15$$

$$12) |5b - 4| = 16$$

$$b = 4 \quad b = -2.4$$

$$14) 7 + |r| = 9$$

$$r = -2 \quad r = 2$$

$$16) |5 + r| - 2 = 2$$

$$|5 + r| = 4$$

$$5 + r = -4$$

$$r = -9$$

$$5 + r = 4$$

$$r = -1$$

$$17) 7 + 9|r| = 16$$

$$\begin{array}{r} -7 \quad -7 \\ 9|r| = 9 \\ \hline 9 \quad 9 \end{array}$$

$$|r| = 1$$

$$r = 1 \quad r = -1$$

$$19) 2 - 9|5x| = -88$$

$$\begin{array}{r} -2 \quad -2 \\ -9|5x| = -90 \\ \hline -9 \quad -9 \end{array}$$

$$|5x| = 10$$

$$5x = 10 \quad x = 2$$

$$5x = -10 \quad x = -2$$

$$18) |p| - 4 = 6$$

$$p = 10 \quad p = -10$$

$$20) 2 - 3|1 - 9k| = -49$$

$$\begin{array}{r} -2 \quad -2 \\ -3|1 - 9k| = -51 \\ \hline -3 \quad -3 \end{array}$$

$$|1 - 9k| = 17$$

$$1 - 9k = 17$$

$$-9k = 16$$

$$k = -\frac{16}{9}$$

$$1 - 9k = 17$$

$$-9k = 18$$

$$k = 2$$