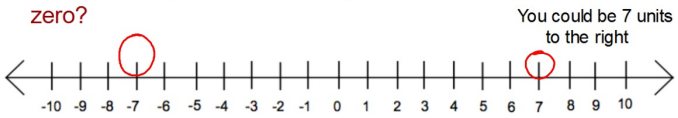
Where could you be located if you are 7 units from zero?



You could also be 7 units to the left.

Section 3-6 Absolute Value Equations

What are possible values for x that make this statement true?

$|x| = 13$

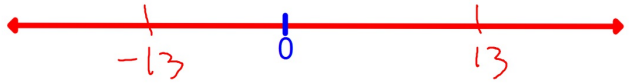
because |-13| and |13| both equal 13:

$x = \pm 13$

Absolute Value: Distance from zero on a number line.

$|x| = 13$

Where are you on a number line if you are exactly 13 units from zero?



You could be 13 units to the left of zero (-13) or 13 units to the right of zero (+13)

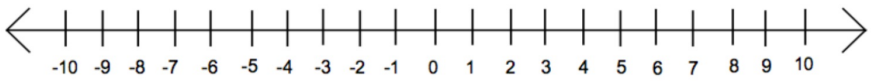
Solve. $|x| = 9$

Since $|-9| = 9$ and $|9| = 9$

$x = -9, 9 = \pm 9$

OR Solve. | x | = 9

x is exactly 9 units from zero



x = -9 or x = 9

Solve. | x +2 | = 5

|5| = 5 or | -5 | = 5

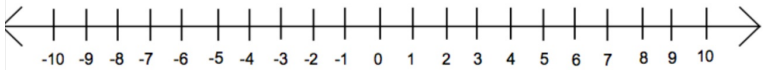
$x+2=5$ $-2\ -2$

$x+2=-5$ $-2\ -2$

$x=3$ or $x=-7$

Solve. | x +2 | = 5

x + 2 is exactly 5 units from zero:



$x+2=-5$ $-2\ -2$ or $x+2=5$ $-2\ -2$

$x=-7$ or $x=3$

Steps to solve Absolute Value Equations:

ex prob: Solve |x - 3.5| + 2 = 12

$-2\ -2$

$|x-3.5|=10$

$x-3.5=10$ $+3.5\ +3.5$

$x-3.5=-10$ $+3.5\ +3.5$

$x=13.5$ $x=-6.5$

What are possible values for x that make this statement true?

$$|x - 3| = 6$$

$|6| = 6$ $\qquad$ $|-6| = 6$

$x - 3 = 6$ $\qquad$ $x - 3 = -6$

$+3 \quad +3 \qquad +3 \quad +3$

$x = 9$ or $x = -3$

Solve. $\quad |2x + 1| = 13$

$2x + 1 = 13$ $\qquad$ $2x + 1 = -13$

$-1 \quad -1 \qquad -1 \quad -1$

$\frac{2x}{2} = \frac{12}{2}$ $\qquad$ $\frac{2x}{2} = \frac{-14}{2}$

$x = 6$ or $x = -7$

Solve. $\quad |x - 2| + 7 = 15$

$-7 \quad -7$

$|x - 2| = 8$

$x - 2 = 8$ $\qquad$ $x - 2 = -8$

$+2 \quad +2 \qquad +2 \quad +2$

$x = 10$ $\qquad$ $x = -6$

Solve. $\quad |x - 5| + 18 = 8$

$-18 \quad -18$

$|x - 5| = -10$

the absolute value can't give -10 as an answer.

No Solution

Solve. $-3|8x| = -30$

$\frac{-3|8x|}{-3} = \frac{-30}{-3}$

$|8x| = 10$

$8x = 10$ or $8x = -10$

$\frac{8x}{8} = \frac{10}{8}$ or $\frac{8x}{8} = \frac{-10}{8}$

$x = 1.25$ or $x = -1.25$

Solve. $4|x + 3| - 9 = 23$

$+9 \quad +9$

$\frac{4|x+3|}{4} = \frac{32}{4}$

$|x+3| = 8$

$x + 3 = 8$ or $x + 3 = -8$

$-3 \quad -3$ or $-3 \quad -3$

$x = 5$ or $x = -11$

Solve. $-2|x + 1| - 10 = 6$

$+10 \quad +10$

$\frac{-2|x+1|}{-2} = \frac{16}{-2}$

$|x+1| = -8$

No Solution. The absolute value can't equal a negative value

Solve. $\frac{6|2.5x|}{6} = \frac{30}{6}$

$|2.5x| = 5$

$2.5x = 5$ or $2.5x = -5$

$\frac{2.5x}{2.5} = \frac{5}{2.5}$ or $\frac{2.5x}{2.5} = \frac{-5}{2.5}$

$x = 2, -2$

Solve. $\left|\frac{1}{3}x\right| + 8 = 20$

$-8 \quad -8$

$\left|\frac{1}{3}x\right| = 12$

$3 \cdot \frac{1}{3}x = 12 \cdot 3$ or $3 \cdot \frac{1}{3}x = -12 \cdot 3$

$x = 36, -36$

You can now finish Hwk #17

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