

Absolute Value Equations

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Review – Definition of Absolute Value

The absolute value of a number refers to the number's distance from zero on the real number line. We use $| \quad |$ to denote absolute value.

$$|-5| = 5 \quad \text{abs. value} \neq \text{negative}$$

$$|5| = 5$$

[Solve the equations.]

$$|x-5| = 2$$

$$x-5=2 \text{ or } x-5=-2$$

$$x=7 \qquad \qquad \qquad x=3$$

ck: $|7-5|=2$
 $|2|=2 \checkmark$

$|3-5|=2$
 $|-2|=2 \checkmark$

$\{3,7\}$

$$|2x-1| = 5$$

$$\begin{array}{l} 2x-1=5 \text{ or } 2x-1=-5 \\ +1 \quad +1 \qquad \qquad +1 \quad +1 \\ \hline 2x=6 \qquad \qquad 2x=-4 \\ x=3 \qquad \qquad \qquad x=-2 \end{array}$$

$\{-2,3\}$

$|2(-2)-1|=5$
 $|-5|=5 \checkmark$

$|2(3)-1|=5$
 $|5|=5 \checkmark$

[More examples]

Isolate 1st

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

$$\begin{array}{l} -5 \quad -5 \\ \hline \end{array}$$

$$|x-1| = -2$$

\emptyset

$$|1-3x| - 4 = 7$$

$$\begin{array}{l} +4 \quad +4 \\ \hline \end{array}$$

$$|1-3x| = 11$$

$$1-3x=11 \text{ or } 1-3x=-11$$

$$\begin{array}{l} -1 \quad -1 \qquad \qquad -1 \quad -1 \\ \hline -3x=10 \qquad \qquad -3x=-12 \\ x=-\frac{10}{3} \qquad \qquad \qquad x=4 \end{array}$$

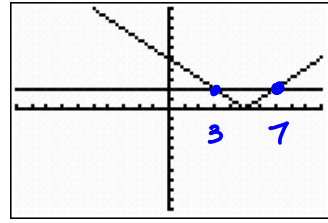
$\{-\frac{10}{3}, 4\}$

Using calculator to check

$$|x - 5| = 2$$

$$x - 5 = 2 \quad \text{or} \quad x - 5 = -2$$
$$x = 7 \quad \quad \quad x = 3$$

```
Plot1 Plot2 Plot3
Y1=abs(X-5)
Y2=2
Y3=
Y4=
Y5=
Y6=
Y7=
```



MATH > NUM
1. abs(