Absolute Value Equations and Inequalities.

$|-3| = 3 = -(-3)$

$|3| = 3$

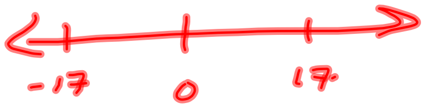
Solve the following absolute value equation. Use the basic absolute value equations.

$|x| = 17$

$$f(x) = |x| = \begin{cases} x & \text{if } x \geq 0 \\ -x & \text{if } x < 0 \end{cases}$$

$|x| = 17 \implies$

$x = 17$ OR $x = -17$

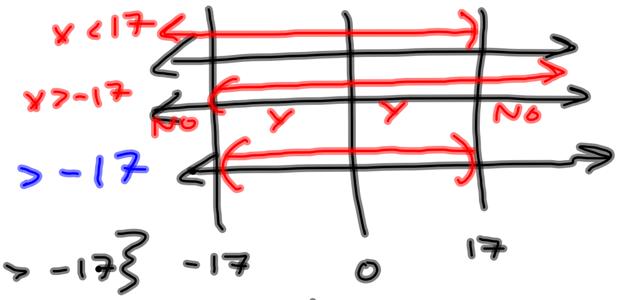


$\implies x \in \{-17, 17\}$

x equals seventeen

$|x| < 17$

$x < 17$ AND ($\cap$) $x > -17$

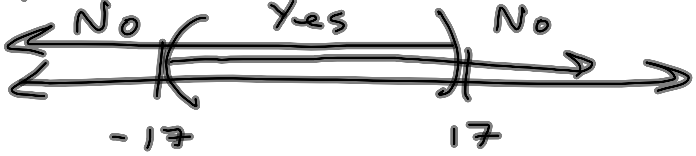


Set-builder

$\{x \mid x < 17 \text{ and } x > -17\}$

Interval $=$ $(-17, 17)$ = Interval Notation.

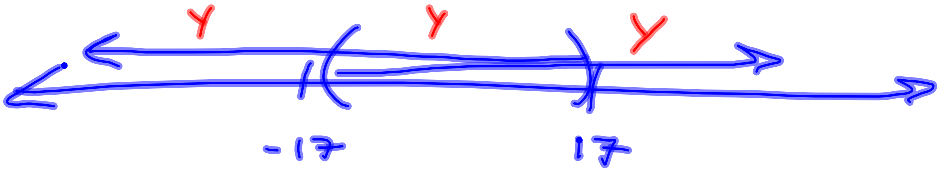
$= (-\infty, 17) \cap (-17, \infty)$



$x < 17$ OR $x > -17$

OR - one, the other, <u>or both</u>

It's "<u>inclusive</u>"



$= (-\infty, \infty) = \mathbb{R} = \{x \mid x \text{ is real}\}$

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$|x| > 17$

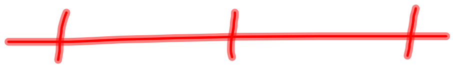
$\{x \mid x > 17$ OR $x < -17\}$

$(-\infty, -17) \cup (17, \infty)$

$|x| < 17$

$x < 17$ and $x > -17$

One with Fractions.



Solve the following absolute value equation.

$$\frac{1}{6}|x-5| = 3$$

$$\frac{|x-5|}{6} = 3 \cdot \frac{6}{6}$$

$$\frac{|x-5|}{6} = \frac{18}{6}$$

$$|x-5| = 18$$

$x-5 = 18$ OR $x-5 = -18$

$+5 = +5$ OR $x = -13$

$x = 23$

Kaylee $x \in \{-13, 23\}$

$|x-5| = 18$

Break it Down

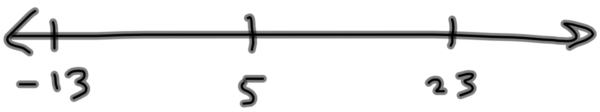
$x = 23$ OR $x = -13$

$x \in \{23\}$ OR $x \in \{-13\}$

$x \in \{23\}$ OR $\{-13\}$

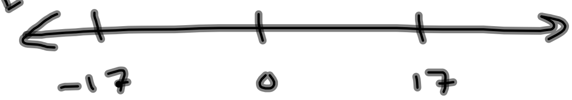
$x \in \{23\} \cup \{-13\}$

$= \{23, -13\}$



$x \in \{x \mid x = 23 \text{ OR } x = -13\}$

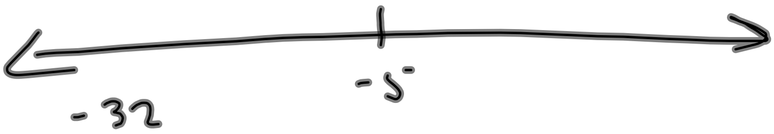
Pics &
Ideas.



$|x| = 17$

$|x - 0| = 17$

$|x+5| = |x-(-5)| = 27$



Reduce to the previous case...

Solve the following absolute value equation.

$3|y+3|-15=0$

$3|y+3|-15=0$

$3|y+3|=15$

$|y+3|=5$

etc.

$|A|=B$

$A=B$ OR $A=-B$

$|A|<B \Rightarrow$

$A<B$ AND $A>-B$

$|A|>B \Rightarrow$

$A>B$ OR $A<-B$

Must isolate the absolute value to play this game.

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Pseudo-quadratic

Solve the following equation.

$$(x+3)^2 = x^2 + 6$$

$(x+3)^2 = (x+3)(x+3)$

$(a+b)^2 = a^2 + 2ab + b^2$

$= x^2 + 6x + 9$

x

$(a+b)^3 = a^3 + 3a^2b + 3ab^2 + b^3$

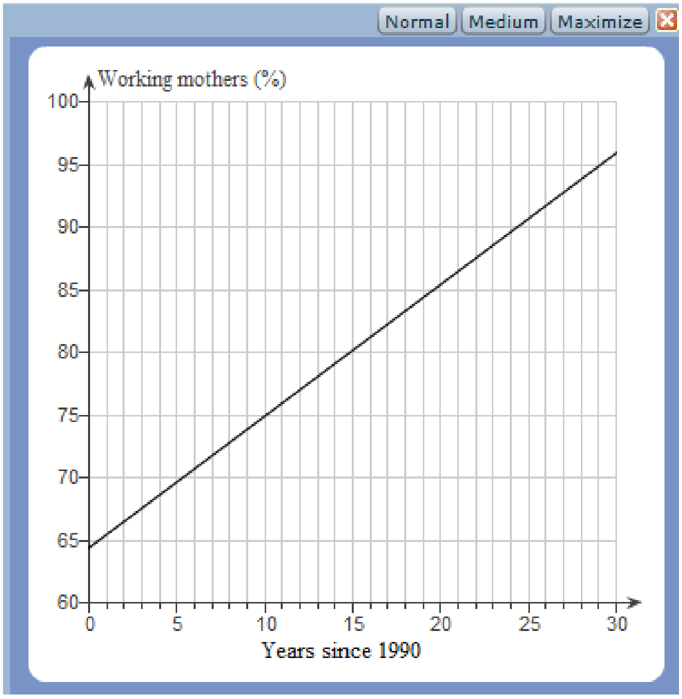
$(a+b)^4 = a^4 + 4a^3b + 6a^2b^2 + 4ab^3 + b^4$

1
1 1
1 2 1
1 3 3 1
1 4 6 4 1

Solve the following equation.

$$\frac{x+3}{x+6} = \frac{x+2}{x+3}$$

a) Use the accompanying graph to estimate the year in which 75% of r
were in the work force.



A surfboard shaper has to limit the cost of development and production to \$276 per surfboard. He has already spent \$58,760 on equipment for the boards. The development and production costs are \$146 per board. The cost per board is $\frac{146x + 58{,}760}{x}$ dollars. Determine the number of boards that must be sold to limit the final cost per board to \$276.

How many boards must be sold to limit the cost per board to \$276?

Not sure about this one. I *think* that most of the numbers here are just showing you what went into the cost-per-board function. Our focus is just on the cost per board. With the tools we have, our best bet might be just to build a table. We basically want that function to be less than \$276.