

Find an equation of the line through $(-2, 3)$ & $(5, -2)$ and graph it.

Standard Form: $Ax + By = C$

Point-Slope: $y - y_1 = m(x - x_1)$

Slope-Intercept: $y = mx + b$

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{-2 - 3}{5 - (-2)} = \frac{-5}{7}$$

$$y - 3 = -\frac{5}{7}(x + 2) \quad \text{Point Slope.}$$

Path to standard form:

$$\begin{array}{r} 7y - 21 = -5(x + 2) = -5x - 10 \\ +5x \quad +21 \qquad \qquad \qquad = +5x + 21 \\ \hline \end{array}$$

$$5x + 7y = 11 \quad \text{Standard}$$

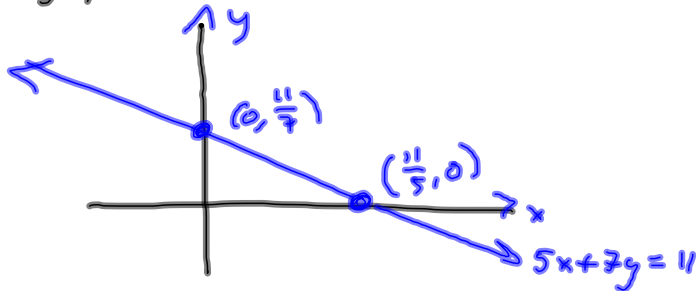
x	y
0	$\frac{11}{7}$
$\frac{11}{5}$	0

$$7y = 11 \Rightarrow y = \frac{11}{7}$$

$$(0, \frac{11}{7})$$

$$5x = 11 \Rightarrow x = \frac{11}{5}$$

$$(\frac{11}{5}, 0)$$



Slope-Intercept:

$$5x + 7y = 11$$

$$7y = -5x + 11$$

$$y = \frac{-5x + 11}{7} = -\frac{5}{7}x + \frac{11}{7}$$

$$y = -\frac{5}{7}x + \frac{11}{7} \quad \text{Slope-Intercept.}$$

CB part of final:

Solve quadratic in 3 ways.

Use discriminant to determine the nature & number of solutions.

$$|3x-5|=7$$

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

etc.

$$|3x-5| = -7 \quad \text{Never!}$$

→ Negative.

$$|3x-5| < 7$$

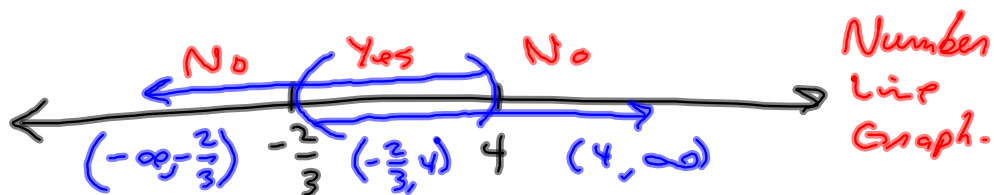
$$3x-5 < 7 \quad \text{AND} \quad 3x-5 > -7$$

$$\begin{array}{r} +5 = +5 \\ \hline 3x < 12 \end{array}$$

$$\begin{array}{r} +5 = +5 \\ \hline 3x > -2 \end{array}$$

$$\left\{ x \mid x < 4 \quad \text{AND} \quad x > -\frac{2}{3} \right\}$$

is set-builder version.



"AND" needs both to be happy

$$x \in \left(-\frac{2}{3}, 4\right) \text{ is interval answer}$$

$$|3x-5| < -7 \quad \text{Never!} \quad \emptyset$$

$$|3x-5| > -7 \quad \text{Always!} \quad (-\infty, \infty)$$

$$|3x-5| > 7$$

$$3x-5 > 7 \quad \text{OR} \quad 3x-5 < -7$$

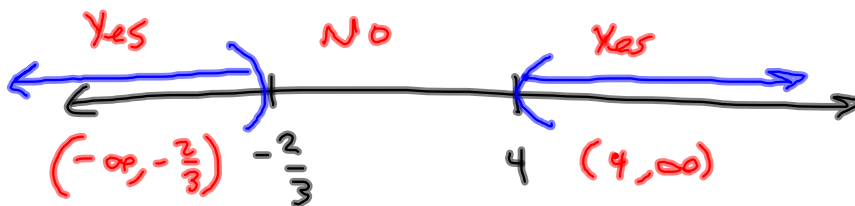
$$3x > 12$$

$$3x < -2$$

$$\left\{ x \mid x > 4 \right.$$

OR

$$\left. x < -\frac{2}{3} \right\}$$



"OR" needs at least one of 'em happy.

Or's with overlap:
 $\{x \mid x > 3 \text{ OR } x > -7\}$



$$= (-7, \infty)$$

Another one comes up in

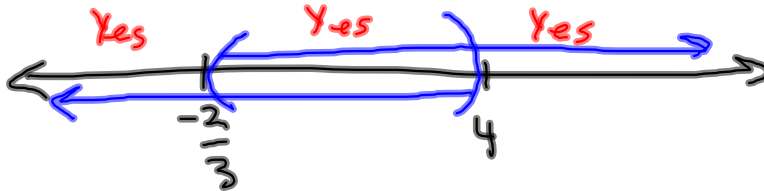
$$\boxed{|3x-5| > -7} \text{ if you don't just "see" } (-\infty, \infty), \text{ instantly.}$$

$$\{x \mid x \text{ is real}\}$$

$$3x-5 > -7 \quad \text{OR} \quad 3x-5 < -7$$

$$3x > -2 \quad \quad \quad 3x < -12$$

$$\{x \mid x > -\frac{2}{3} \quad \text{OR} \quad x < -4\}$$



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