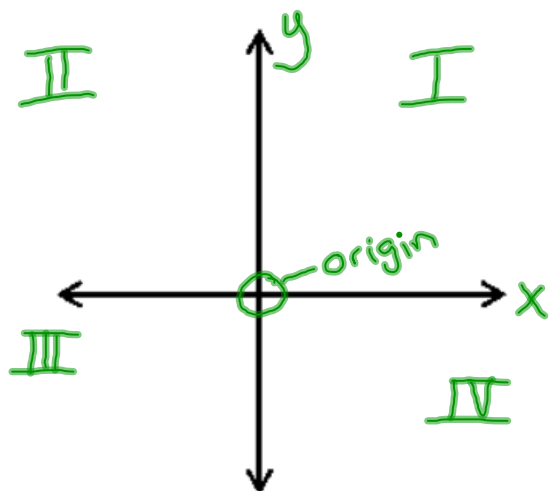


Section 1.1: Points and Lines

COORDINATE PLANE

Label the...

*x and y-axis

*4 quadrants

*origin

LINEAR EQUATIONS

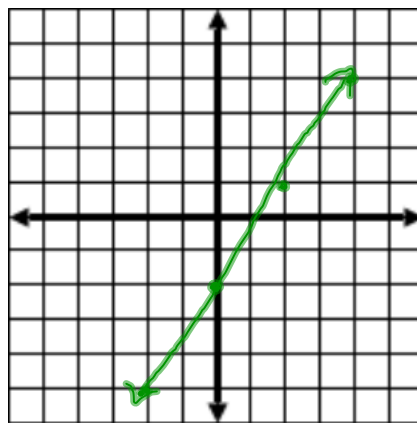
Standard or General Form

$$Ax + By = C$$

Slope-intercept Form

$$y = mx + b$$

Slope = $\frac{\text{rise}}{\text{run}}$



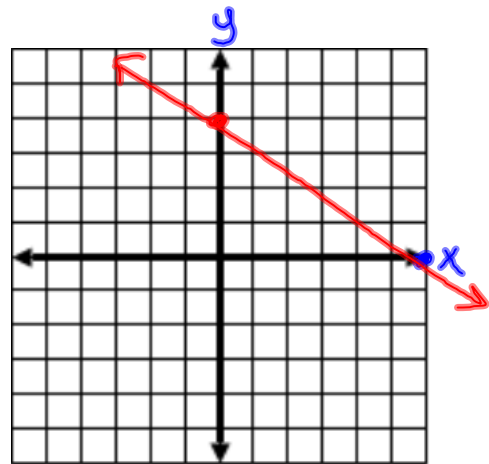
Example: Graph $y = \frac{3}{2}x - 2$

Slope (m) \nearrow $\frac{3}{2}$ \uparrow y-int

INTERCEPTS of a LINEAR EQUATION

x-intercept: where the line crosses the x-axis
every x-intercept has a y-value of zero

y-intercept: where the line crosses the y-axis
every y-intercept has a x-value of zero



Example: Graph $2x + 3y = 12$
using intercepts

$$\begin{array}{l} \text{x int} \\ y=0 \\ 2x+3(0)=12 \\ 2x=12 \\ x=6 \quad (6,0) \end{array}$$

$$\begin{array}{l} \text{y int} \\ x=0 \\ 2(0)+3y=12 \\ 3y=12 \\ y=4 \quad (0,4) \end{array}$$

Solving a SYSTEM of LINEAR EQUATIONS

To solve a system means to find the point of intersection,
which is a coordinate (x, y) .

Ways to solve a system: graphing
substitution
linear combination

Example: $(3x - y = 4)$ $(5x + 3y = 9)$ Solve using linear
combination *and*
then graphing

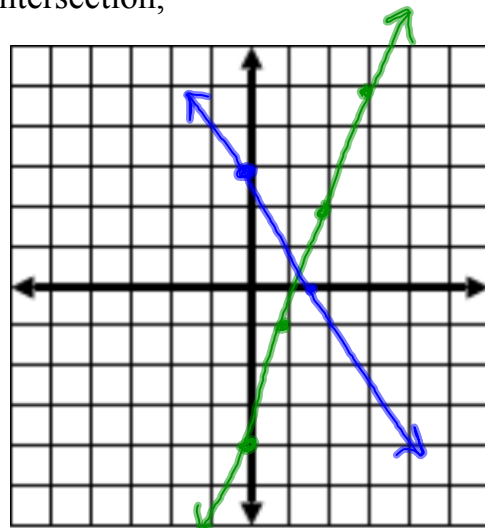
$$\begin{array}{r} 5x + 3y = 9 \\ 9x - 2y = 12 \\ \hline 14x = 21 \end{array}$$

$$x = \frac{21}{14} = \frac{3}{2}$$

$$3\left(\frac{3}{2}\right) - y = 4$$

$$\frac{9}{2} - y = 4 \rightarrow -y = 4 - \frac{9}{2} \quad -y = -\frac{1}{2} \\ y = \frac{1}{2}$$

$$\left(\frac{3}{2}, \frac{1}{2}\right)$$



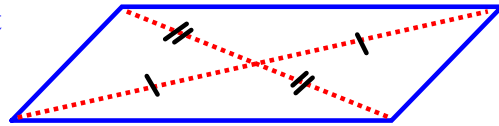
$$\begin{array}{l} 3x - y = 4 \\ -y = 4 - 3x \\ y = -4 + 3x \\ 3y = 9 \quad 5x = 9 \\ y = 3 \quad x = 9/5 \end{array}$$

*If solve by
graphing it may be
hard to give an
exact answer

SPECIAL CASES for Systems of Linear Equations**No solution:***Graphs of the lines are parallel* *slopes are equal**Infinitely many solutions:***Graphs of the lines are on top of each other*REVIEW of Geometric information

$$\text{Area of a triangle} = \frac{1}{2} (\text{base})(\text{height}) = \frac{B \cdot H}{2}$$

Parallelogram: Has 2 pairs of parallel sides
 Opposite sides are congruent
 Diagonals bisect each other

DISTANCE and MIDPOINT FORMULAS

Midpoint Formula

$$\left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right)$$

Distance Formula

$$\sqrt{(x_1 - x_2)^2 + (y_1 - y_2)^2}$$

EXAMPLES:Find the midpoint and the length of \overline{NM} .

N $\begin{matrix} x & y \\ (-1, & 8) \end{matrix}$ and M $\begin{matrix} x & y \\ (3, & 13) \end{matrix}$

 $(1, 10.5)$

$$\left(\frac{-1+3}{2}, \frac{8+13}{2} \right) = (1, 10.5)$$

$$\sqrt{(-1-3)^2 + (8-13)^2} = \sqrt{(-4)^2 + (-5)^2} = \sqrt{16+25} = \sqrt{41} \text{ units}$$

or 6.4 un

Homework

p5 #1-27 odd

(Always the WE exercises)