

Equations, Intercepts, Midpoint & Distance RF#7 & 8

Intercepts

■ What is a y-intercept?

Where the pt crosses the y axis

■ How do you find a y-intercept

○ Given a graph?

locate pts on y-axis

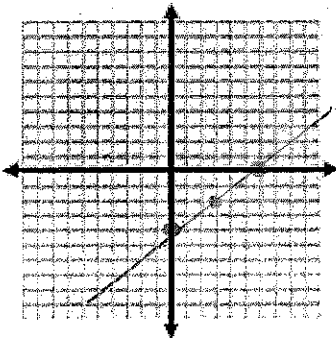
○ Given an equation?

let $x = 0$ to solve for y

General form $y = -\frac{C}{B}$

Graph the following:

a) $y = 2/3x - 4$



-- What is an x-intercept?

Where the pt crosses the x axis

-- How do you find an x-intercept

Given a graph?

locate pts on x axis

Given an equation?

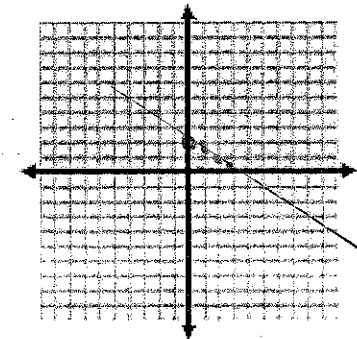
let $y = 0$ to solve for x

General form = $x = -\frac{C}{A}$

b) $x + 2y = 4$

x	y
0	2
1	1.5
2	1
3	0.5

$$\begin{aligned} 0 + 2y &= 4 \\ 2y &= 4 \\ y &= 2 \end{aligned}$$



$$\begin{aligned} 1 + 2y &= 4 \\ 2y &= 3 \\ y &= 3/2 \text{ or } 1.5 \end{aligned}$$

$$\begin{aligned} 3 + 2y &= 4 \\ 2y &= 1 \\ y &= 1/2 \text{ or } 0.5 \end{aligned}$$

$$\begin{aligned} 2 + 2y &= 4 \\ 2y &= 2 \\ y &= 1 \end{aligned}$$

Find the intercepts.

a) $2x - y = 2$

$$\begin{aligned} 2x - 0 &= 2 \\ 2x &= 2 \\ x &= 1 \\ (1, 0) \end{aligned}$$

$$\begin{aligned} 2(0) - y &= 2 \\ -y &= 2 \\ y &= -2 \\ (0, -2) \end{aligned}$$

b) $3x + 4y - 12 = 0$

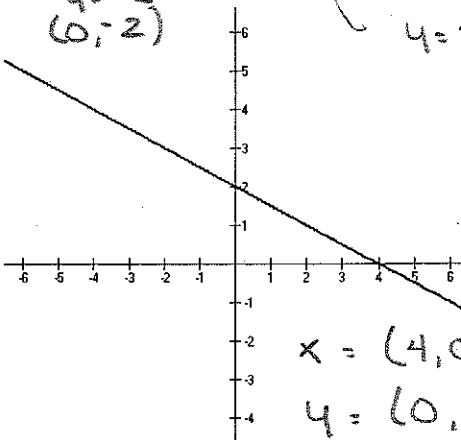
$$x = -\frac{C}{A} = -\frac{-12}{3} = 4$$

$$y = -\frac{C}{B} = -\frac{-12}{4} = 3$$

$$x = (4, 0)$$

$$y = (0, 3)$$

c)



$$x = (4, 0)$$

$$y = (0, 3)$$

Write in equation form $y = mx + b$

a) $m = \frac{5}{3}, b = -2$

$y = \frac{5}{3}x - 2$

b) $(4, -3) \text{ \& } (2, 1)$

$\frac{y_2 - y_1}{x_2 - x_1} = \frac{1 - (-3)}{2 - 4} = \frac{4}{-2} = -2$

$y - (-3) = -2(x - 4)$
 $y + 3 = -2x + 8$
 $y = -2x + 5$

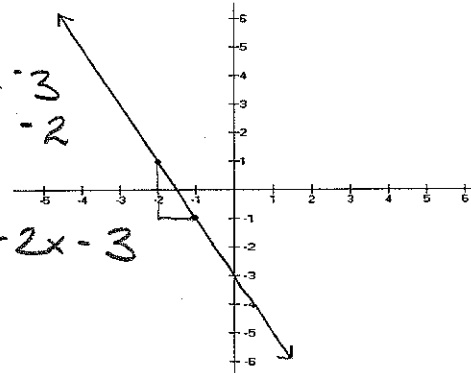
b) $m = \frac{1}{2}, (4, -2)$

$y - (-2) = \frac{1}{2}(x - 4)$
 $y + 2 = \frac{1}{2}x - 2$
 $y = \frac{1}{2}x - 4$

d)

$b = -3$
 $m = -2$

$y = -2x - 3$



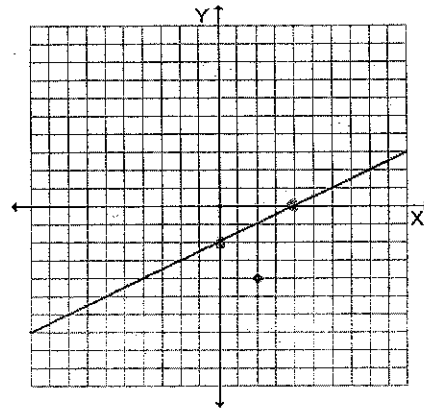
Write the equation of a line that is PARALLEL to the given line and passes through the given point.

a) $y = -3x - 2; (2, -1)$

$y - (-1) = -3(x - 2)$
 $y + 1 = -3x + 6$
 $y = -3x + 5$

b) $(2, 4)$
 $m = \frac{3}{4} = \frac{1}{2}$

$y - 4 = \frac{1}{2}(x - 2)$
 $y + 4 = \frac{1}{2}x - 1$
 $y = \frac{1}{2}x - 5$



Write the equation of a line that is PERPENDICULAR to the given line and passes through the given point.

$y = \frac{1}{5}x - 2; (-2, 4)$

$y - 4 = -5(x + 2)$
 $y - 4 = -5x - 10$
 $y = -5x - 6$

Distance and Midpoint

a) Calculate the distance between $(4, -3)$ and $(-3, 8)$. $\sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$

b) What is the midpoint of the line segment whose endpoints are $(6, 0)$ and $(3, 7)$? $(x, y) \rightarrow (\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2})$

c) Show that the triangle that has $(0, 1)$, $(2, 3)$ and $(2, -1)$ as vertices is an isosceles triangle

a) $\sqrt{(-3 - 4)^2 + (8 - (-3))^2}$
 $\sqrt{(-7)^2 + (11)^2}$
 $\sqrt{49 + 121}$
 $\sqrt{170}$
 $D = 13.04$

b) $\frac{6+3}{2}, \frac{0+7}{2}$
 $x, y = \frac{9}{2}, \frac{7}{2}$

c) $\sqrt{(2-0)^2 + (3-1)^2}$
 $\sqrt{(2)^2 + (2)^2}$
 $\sqrt{4+4}$
 $\sqrt{8} = 2.82$

$\sqrt{(2-2)^2 + (-1-3)^2}$
 $\sqrt{(0)^2 + (-4)^2}$
 $\sqrt{16}$
 $D = 4$

$\sqrt{(2-0)^2 + (-1-1)^2}$
 $\sqrt{(2)^2 + (-2)^2}$
 $\sqrt{4+4}$
 $\sqrt{8} = 2.82$

Rewrite each of the following:

a) $2x + 4y - 8 = 0$ in slope y intercept form

$$\frac{4y}{4} = \frac{-2x + 8}{4}$$

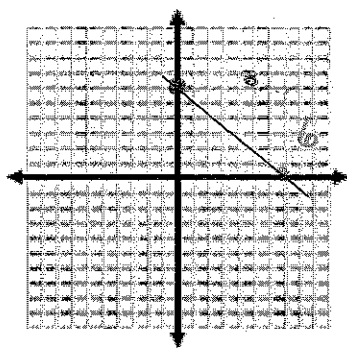
$$y = -\frac{2}{4}x + 2 = y = -\frac{1}{2}x + 2$$

b) $Y + 3 = 4(x - 5)$ in general form

$$y + 3 = 4x - 20$$

$$-4x + y + 23 = 0$$

c) Using graph, write in slope point form



slope $\frac{6}{8}$

point $(8, 0)$

$$y - y_1 = m(x - x_1)$$

$$y - 0 = \frac{6}{8}(x - 8)$$