

2.2 Graphs of Equations and Intercepts

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Determine whether the points are on the graph of the equation.

Ex. 1 $y = x^4 - \sqrt{x}$ $\{(0,0), (1,1), (-1,0)\}$

$$\begin{aligned} 0 &= 0^4 - \sqrt{0} \\ 0 &= 0 \end{aligned}$$

$(0,0)$ is on the graph

$$\begin{aligned} 1 &= 1^4 - \sqrt{1} \\ 1 &= 1 - 1 \\ 1 &= 0 \end{aligned}$$

$(1,1)$ is NOT on the graph

$$\begin{aligned} 0 &= (-1)^4 - \sqrt{-1} \\ 0 &= 1 \end{aligned}$$

$(-1,0)$ is NOT on the graph

$\sqrt{-1}$ imaginary number

Solving for X and Y Intercepts

X-intercept $\rightarrow y = 0$

Y-intercept $\rightarrow x = 0$

Ex. 1 Find the intercepts of $y = x - 6$

X-intercept

$$\begin{aligned} 0 &= x - 6 \\ +6 & \quad +6 \\ \hline 6 &= x \\ (6, 0) \end{aligned}$$

Y-intercept

$$\begin{aligned} y &= 0 - 6 \\ y &= -6 \\ (0, -6) \end{aligned}$$

Ex. 2 Find the intercepts of $y = x^2 - 9$

$$y = (x+3)(x-3)$$

$$\begin{array}{r} 0 \\ 3 \quad -3 \\ \hline -9 \end{array}$$

X-intercept

$$0 = (x+3)(x-3)$$

$$\begin{aligned} 0 &= x+3 \\ -3 & \quad -3 \\ \hline -3 &= x \\ (-3, 0) \end{aligned}$$

$$\begin{aligned} 0 &= x-3 \\ +3 & \quad +3 \\ \hline 3 &= x \\ (3, 0) \end{aligned}$$

Y-intercept

$$\begin{aligned} y &= 0^2 - 9 \\ y &= -9 \\ (0, -9) \end{aligned}$$

OR $y = (0+3)(0-3)$

$$\begin{aligned} y &= (3)(-3) \\ y &= -9 \\ (0, -9) \end{aligned}$$

$$y = 2x + 4$$

x-intercept

y-intercept

$$0 = 2x + 4$$

$$\frac{-4}{2} = \frac{2x}{2}$$

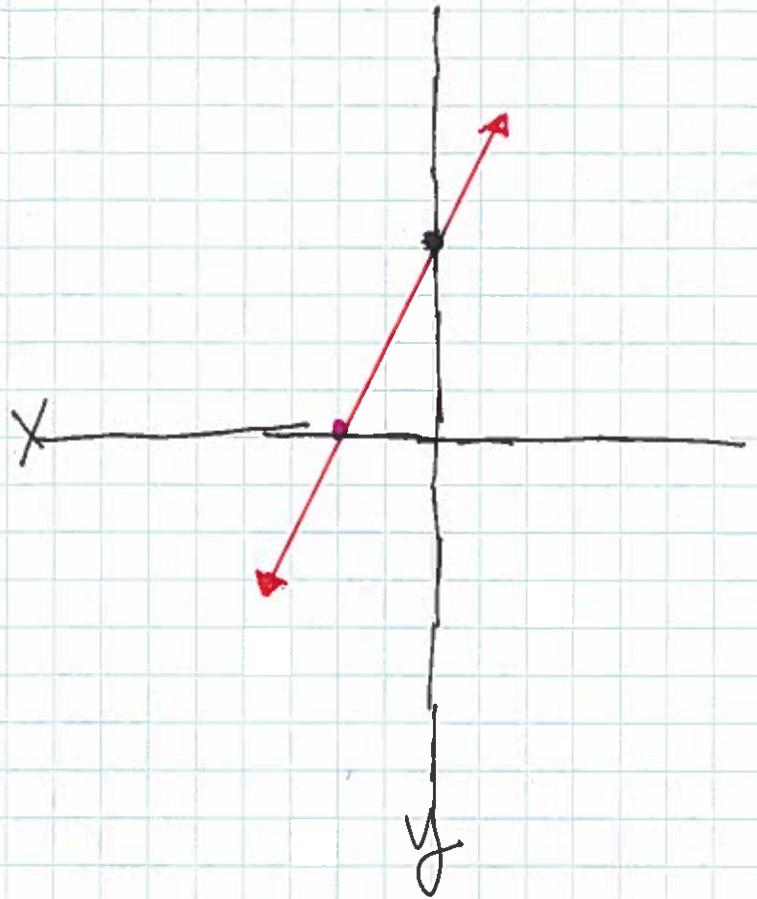
$$-2 = x$$
$$(-2, 0)$$

$$y = 2(0) + 4$$

$$y = 0 + 4$$

$$y = 4$$

$$(0, 4)$$



$$5x + 2y = 10$$

x-intercept

y-intercept

$$5x + 2(0) = 10$$

$$5(0) + 2y = 10$$

$$\frac{5x}{5} = \frac{10}{5}$$

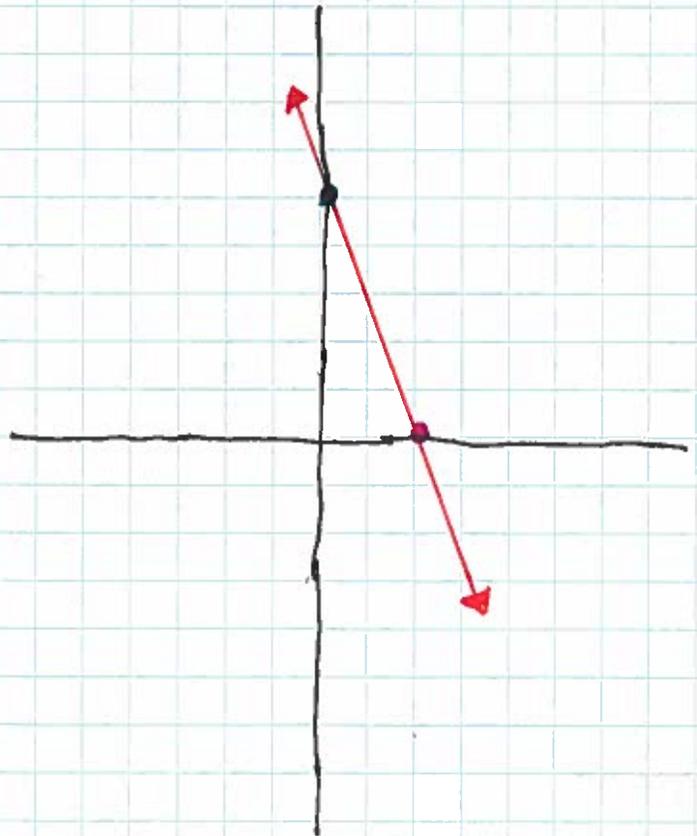
$$\frac{2y}{2} = \frac{10}{2}$$

$$x = 2$$

$$y = 5$$

$$(2, 0)$$

$$(0, 5)$$



$$y = (x-1)(x+b)$$

X-intercepts

$$0 = (x-1)(x+b)$$

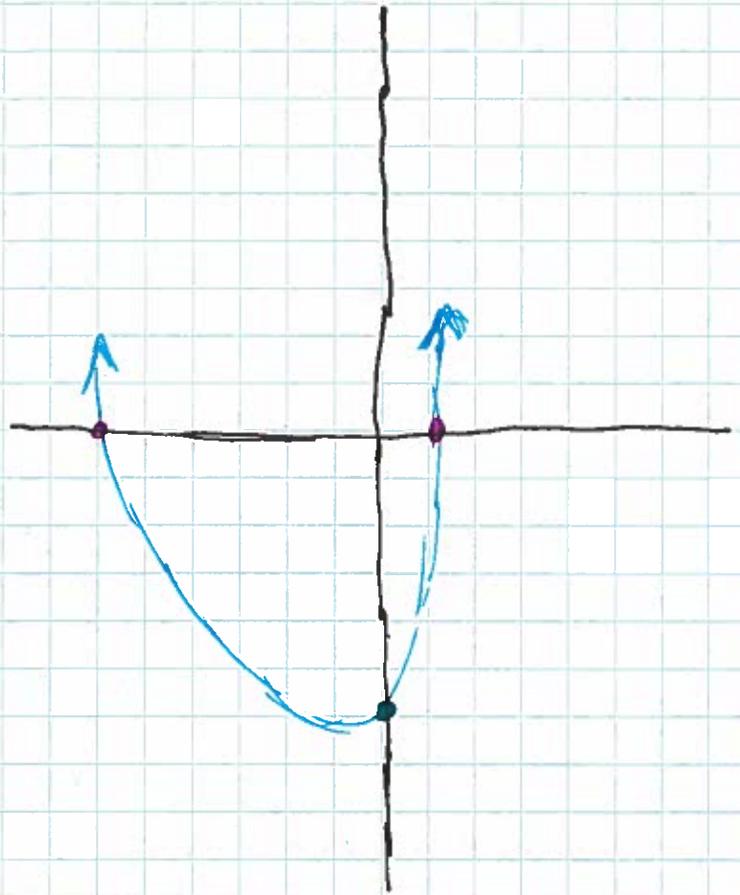
$$\begin{array}{r} 0 = x - 1 \\ +1 \quad +1 \\ \hline 1 = x \\ (1, 0) \end{array}$$

y-intercept

$$y = (0-1)(0+b)$$

$$y = (-1)(b)$$

$$y = -b \\ (0, -b)$$



$$\begin{array}{r} 0 = x + b \\ -b \quad -b \\ \hline -b = x \\ (-b, 0) \end{array}$$

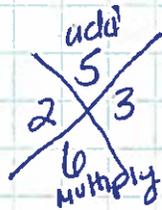
$$y = a(x+b)(x+c)$$

a is positive ↻

a is negative ↺

$$y = x^2 + 5x + 6$$

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



X-intercepts

$$0 = (x+2)(x+3)$$

$$\begin{array}{r} 0 = x + 2 \\ -2 \quad -2 \\ \hline -2 = x \\ (-2, 0) \end{array}$$

y-intercept

$$y = 0^2 + 5(0) + 6$$

$$y = 0 + 0 + 6$$

$$y = 6 \quad (0, 6)$$

OR

$$y = (0+2)(0+3)$$

$$y = (2)(3)$$

$$y = 6 \quad (0, 6)$$

