

Answer on Question #77767, Math /Linear Algebra

1. Sketch the graph of the linear function

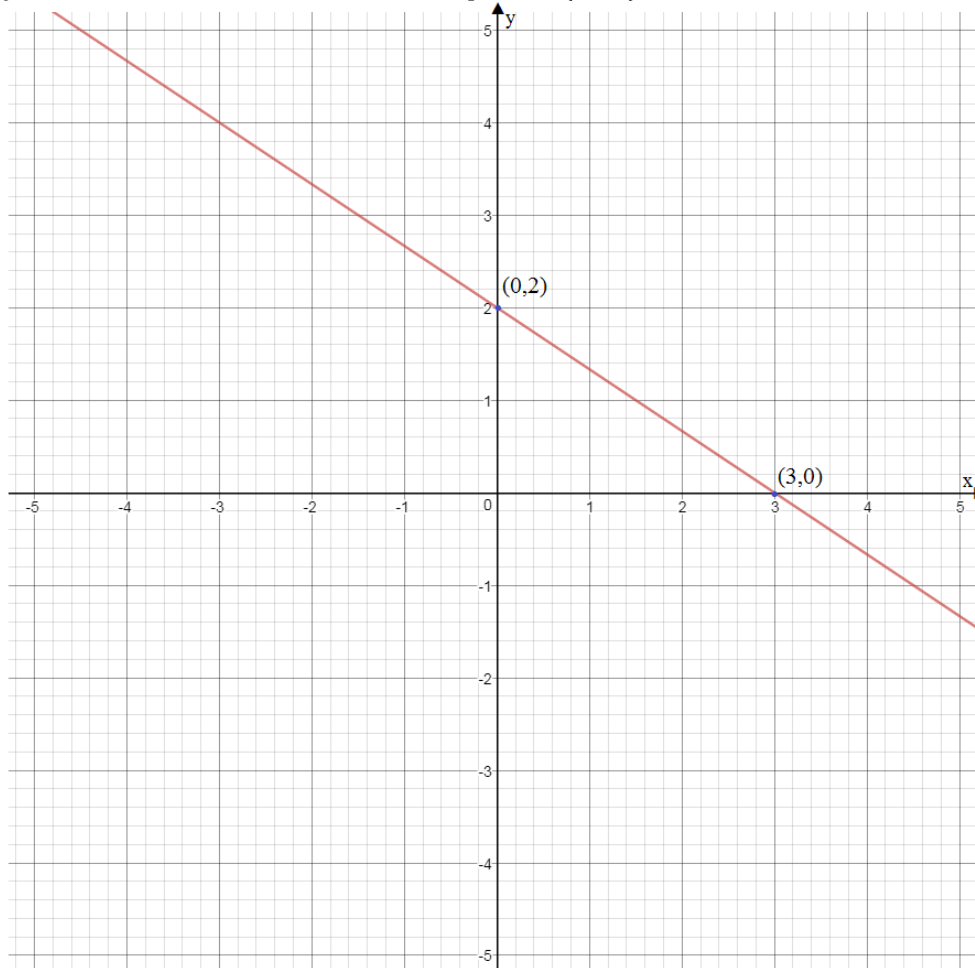
a) $2x + 3y = 6$

Solution

This is the straight line. Find two points

$$x = 0, 0 + 3y = 6 \Rightarrow y = 2; \text{point}(0, 2)$$

$$y = 0, 2x + 0 = 6 \Rightarrow x = 3; \text{point}(3, 0)$$

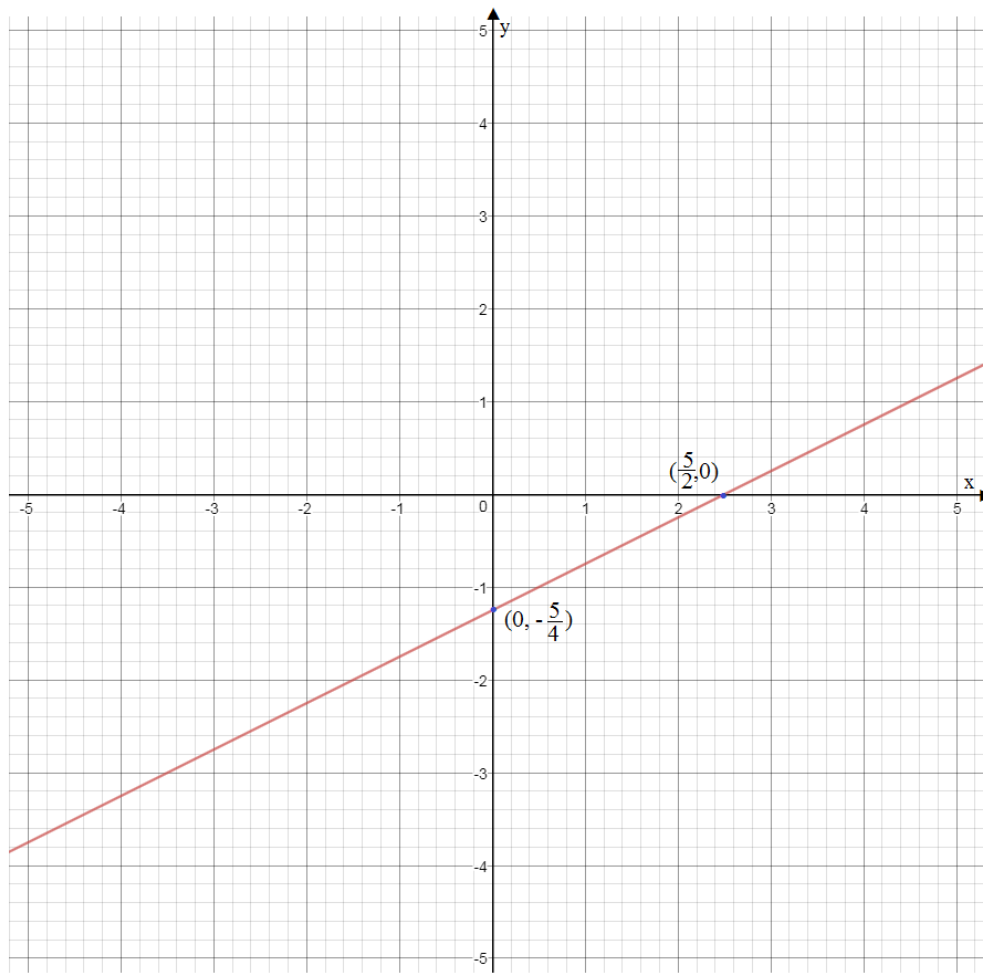


b) $4y - 2x + 5 = 0$

This is the straight line. Find two points

$$x = 0, 4y - 0 + 5 = 0 \Rightarrow y = -\frac{5}{4}; \text{point}\left(0, -\frac{5}{4}\right)$$

$$y = 0, 0 - 2x + 5 = 0 \Rightarrow x = \frac{5}{2}; \text{point}\left(\frac{5}{2}, 0\right)$$



2. The following equations are in the general form $Ax + Bx + C = 0$. Express each of them in the form $y = mx + b$ and state the gradient and y intercept of its graph

a) $3x - y + 2 = 0$

Solution

$$3x - y + 2 = 0$$

$$y = 3x + 2$$

$$\text{gradient} = m = 3$$

$$y - \text{intercept} = b = 2; \text{point}(0, 2)$$

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

Solution

$$3x + 4y + 12 = 0$$

$$y = -\frac{3}{4}x - 3$$

$$\text{gradient} = m = -\frac{3}{4}$$

$$y - \text{intercept} = b = -3; \text{point}(0, -3)$$

$$c) 2x + y - 3 = 0$$

Solution

$$2x + y - 3 = 0$$

$$y = -2x + 3$$

$$\text{gradient} = m = -2$$

$$y - \text{intercept} = b = 3; \text{point}(0, 3)$$

3. The line PQ had an angle of inclination of 60° . What is its gradient?
(answer in surd form)

Solution

Let $\theta = 60^\circ$ be the angle of inclination. Then the slope of the line

$$\text{slope} = m = \tan \theta = \tan 60^\circ = \sqrt{3}$$

$$\text{gradient} = m = \sqrt{3}$$

4. What is the equation of the straight line having:

a) a gradient of 3 and a y intercept of -4

Solution

The equation of the straight line

$$y = mx + b$$

We have that

$$\text{gradient} = m = 3$$

$$y - \text{intercept} = b = -4$$

Then the equation of the straight line

$$y = 3x - 4$$

b) an angle of inclination of 135° and a y intercept of 5

Solution

The equation of the straight line

$$y = mx + b$$

Let $\theta = 135^\circ$ be the angle of inclination. Then the slope of the line

$$\text{slope} = m = \tan \theta = \tan 135^\circ = -1$$

$$\text{gradient} = m = -1$$

$$y - \text{intercept} = b = 5$$

Then the equation of the straight line

$$y = -x + 5$$