Questions

1. Find the equation of the line that passes through the point $(5, -3)$ and has slope $m = -\frac{2}{5}$.

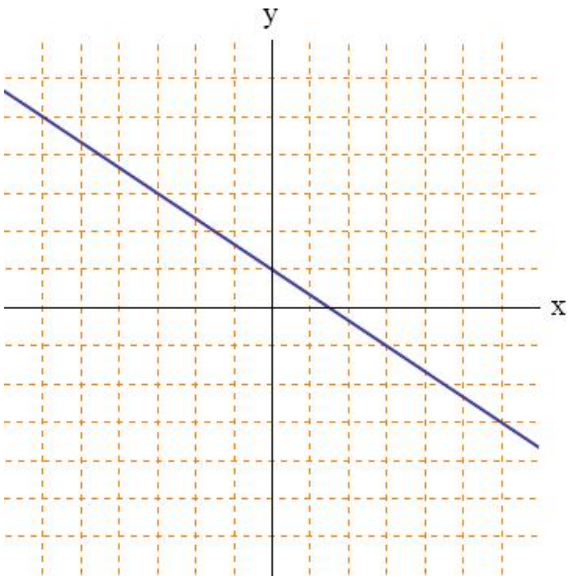
2. Find the equation of the line that passes through the points $\left(1, \frac{5}{6}\right)$ and $\left(3, \frac{3}{2}\right)$.

3. Find the equation of the line that passes through the points $(2, 0)$ and $\left(\frac{3}{2}, \frac{1}{2}\right)$.

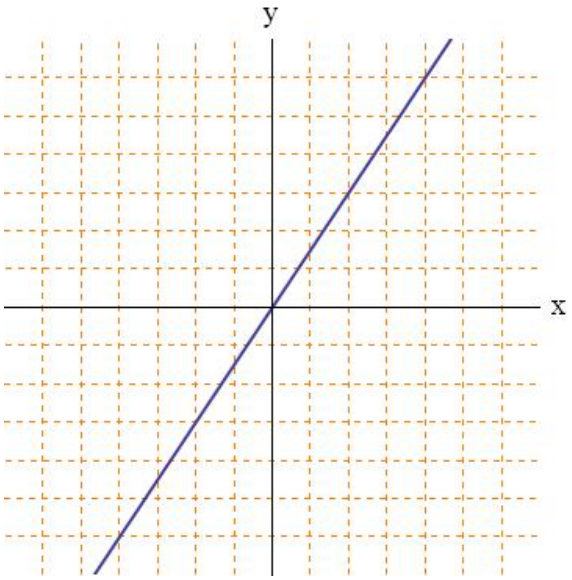
4. Find the equation of the line that passes through the point $(4, 3)$ and has slope $m = -2$.

5. Find the equation of the line that passes through the points $(1, -8)$ and $(2, -14)$.

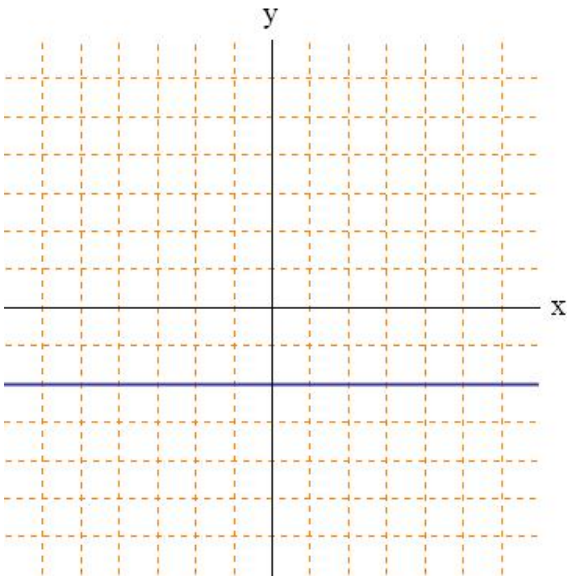
6. Write the equation of the line given below.



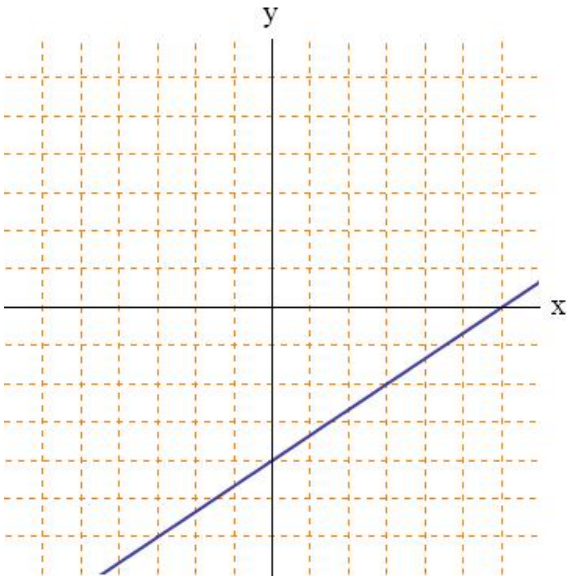
7. Write the equation of the line given below.



8. Write the equation of the line given below.



9. Write the equation of the line given below.



Solutions

1. Use the slope-point equation of a line.

$$\begin{aligned} y - y_1 &= m(x - x_1) \\ y - (-3) &= -\frac{2}{5}(x - 5) \\ y + 3 &= -\frac{2}{5}x + 2 \\ y &= -\frac{2}{5}x - 1 \end{aligned}$$

2. slope $= \dfrac{\Delta y}{\Delta x} = \dfrac{\frac{5}{6} - \frac{3}{2}}{1 - 3} = \dfrac{\left(-\frac{4}{6}\right)}{-2} = \dfrac{1}{-2} \cdot \left(-\dfrac{4}{6}\right) = \dfrac{1}{3}.$

Now use the slope-point equation of a line.

$$\begin{aligned} y - y_1 &= m(x - x_1) \\ y - \frac{5}{6} &= \frac{1}{3}(x - 1) \\ y - \frac{5}{6} &= \frac{1}{3}x - \frac{1}{3} \\ y &= \frac{1}{3}x - \frac{1}{3} + \frac{5}{6} \\ y &= \frac{1}{3}x - \frac{2}{6} + \frac{5}{6} \\ y &= \frac{1}{3}x + \frac{3}{6} \\ y &= \frac{1}{3}x + \frac{1}{2} \end{aligned}$$

3. slope $= \dfrac{\Delta y}{\Delta x} = \dfrac{0 - \frac{1}{2}}{2 - \frac{3}{2}} = \dfrac{\left(-\frac{1}{2}\right)}{\left(\frac{1}{2}\right)} = \dfrac{2}{1} \cdot \left(-\dfrac{1}{2}\right) = -1.$

Now use the slope-point equation of a line.

$$\begin{aligned} y - y_1 &= m(x - x_1) \\ y - 0 &= -1(x - 2) \\ y &= -x + 2 \end{aligned}$$

4. Use the slope-point equation of a line.

$$\begin{aligned} y - y_1 &= m(x - x_1) \\ y - (3) &= -2(x - 4) \\ y - 3 &= -2x + 8 \\ y &= -2x + 8 + 3 \\ y &= -2x + 11 \end{aligned}$$

5. slope $= \dfrac{\Delta y}{\Delta x} = \dfrac{-8 - (-14)}{1 - 2} = \dfrac{-8 + 14}{-1} = \dfrac{6}{-1} = -6.$

Now use the slope-point equation of a line.

$$\begin{aligned} y - y_1 &= m(x - x_1) \\ y - (-8) &= -6(x - 1) \\ y + 8 &= -6x + 6 \\ y &= -6x + 6 - 8 \\ y &= -6x - 2 \end{aligned}$$

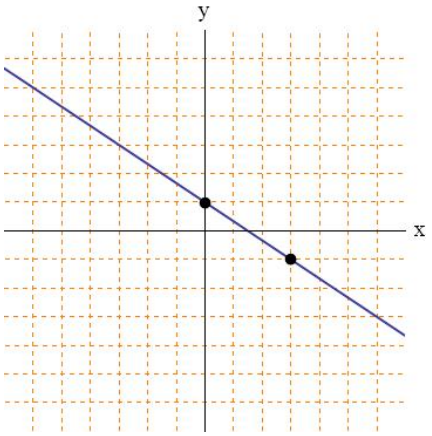
6. You need to be able to read these off the sketch. Look for two points that the line crosses a grid line intersection. Two points: $(0, 1)$ and $(3, -1)$.

Rise $= -2$, Run $= 3$.

slope $= \dfrac{\text{rise}}{\text{run}} = \dfrac{-2}{3} = -\dfrac{2}{3}.$

y-intercept $b = 1$.

$y = mx + b \Rightarrow y = -\dfrac{2}{3}x + 1.$



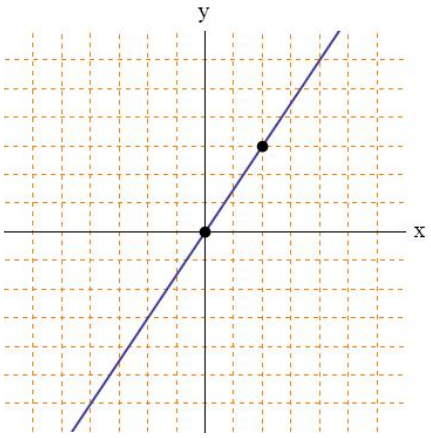
7. Two points: $(0, 0)$ and $(2, 3)$.

Rise $= 3$, Run $= 2$.

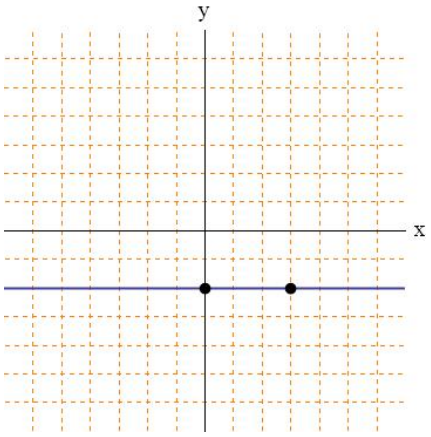
slope $= \dfrac{\text{rise}}{\text{run}} = \dfrac{3}{2}$.

y-intercept $b = 0$.

$y = mx + b \Rightarrow y = \dfrac{3}{2}x$.



8. This is a horizontal line, so it's equation is just $y = -2$.



9. Two points: $(0, -4)$ and $(3, -2)$.

Rise $= 2$, Run $= 3$.

slope $= \dfrac{\text{rise}}{\text{run}} = \dfrac{2}{3}$.

y-intercept $b = -4$.

$y = mx + b \Rightarrow y = \dfrac{2}{3}x - 4$.