

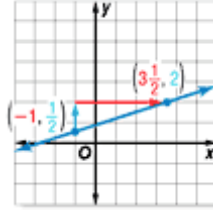
Lesson 5-1

Example 1 Positive Slope

Find the slope of the line that passes through $(3\frac{1}{2}, 2)$ and $(-1, \frac{1}{2})$.

Let $(3\frac{1}{2}, 2) = (x_1, y_1)$ and $(-1, \frac{1}{2}) = (x_2, y_2)$.

$$\begin{aligned} m &= \frac{y_2 - y_1}{x_2 - x_1} && \frac{\text{rise}}{\text{run}} \\ &= \frac{\frac{1}{2} - 2}{-1 - 3\frac{1}{2}} && \text{Substitute. } 3\frac{1}{2} = \frac{7}{2} \\ &= \frac{-\frac{3}{2}}{-\frac{9}{2}} && \text{Simplify.} \\ &= \frac{1}{3} && \text{Divide.} \end{aligned}$$



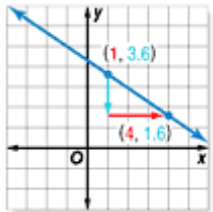
The slope is $\frac{1}{3}$.

Example 2 Negative Slope

Find the slope of the line that passes through $(1, 3.6)$ and $(4, 1.6)$.

Let $(1, 3.6) = (x_1, y_1)$ and $(4, 1.6) = (x_2, y_2)$.

$$\begin{aligned} m &= \frac{y_2 - y_1}{x_2 - x_1} && \frac{\text{rise}}{\text{run}} \\ &= \frac{1.6 - 3.6}{4 - 1} && \text{Substitute} \\ &= \frac{-2}{3} && \text{Simplify.} \end{aligned}$$



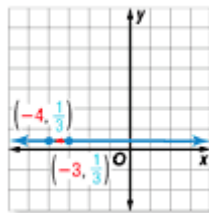
The slope is $-\frac{2}{3}$.

Example 3 Zero Slope

Find the slope of the line that passes through $(-3, \frac{1}{3})$ and $(-4, \frac{1}{3})$.

Let $(-3, \frac{1}{3}) = (x_1, y_1)$ and $(-4, \frac{1}{3}) = (x_2, y_2)$.

$$\begin{aligned} m &= \frac{y_2 - y_1}{x_2 - x_1} && \frac{\text{rise}}{\text{run}} \\ &= \frac{\frac{1}{3} - \frac{1}{3}}{-4 - (-3)} && \text{Substitute} \\ &= \frac{0}{-1} \text{ or } 0 && \text{Simplify.} \end{aligned}$$

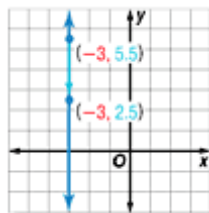


Example 4 Undefined Slope

Find the slope of the line that passes through $(-3, 5.5)$ and $(-3, 2.5)$.

Let $(-3, 5.5) = (x_1, y_1)$ and $(-3, 2.5) = (x_2, y_2)$.

$$\begin{aligned} m &= \frac{y_2 - y_1}{x_2 - x_1} && \frac{\text{rise}}{\text{run}} \\ &= \frac{2.5 - 5.5}{-3 - (-3)} \text{ or } \frac{\cancel{3}}{\cancel{0}} && \text{Substitute.} \end{aligned}$$



Since division by zero is undefined, the slope is undefined.

Example 5 Find Coordinates Given Slope

Find the value of r so that the line through $(-6, -3)$ and $(-1, r)$ has a slope of 2.

Let $(-6, -3) = (x_1, y_1)$ and $(-1, r) = (x_2, y_2)$.

$$\begin{aligned} m &= \frac{y_2 - y_1}{x_2 - x_1} && \frac{\text{rise}}{\text{run}} \\ 2 &= \frac{r - (-3)}{-1 - (-6)} && \text{Substitute.} \\ \frac{2}{1} &= \frac{r + 3}{5} && \text{Subtract. } 2 = \frac{2}{1}. \\ 2(5) &= 1(r + 3) && \text{Find the cross products.} \\ 10 &= r + 3 && \text{Simplify.} \\ 10 - 3 &= r + 3 - 3 && \text{Subtract 3 from each side.} \\ 7 &= r && \text{Simplify.} \end{aligned}$$

