

8.4 The Slope of a Line

Students will be able to find and interpret slopes of lines.

Slope

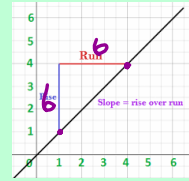
The **slope**, m , of a line is the ratio of the line's vertical change (rise) to its horizontal change (run)

Rise - vertical change

Run - horizontal change

$$\text{Slope} = \frac{\text{rise}}{\text{run}}$$

$$S = \frac{6}{6} = 1$$



A wakeboard ramp has a rise of 6 feet and a run of 10 feet. Find its slope.

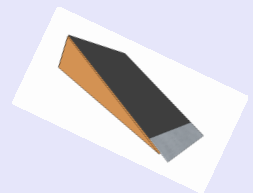
$$\text{slope} = \frac{\text{rise}}{\text{run}} = \frac{6}{10}$$

$$\text{Slope} = \frac{3}{5}$$



A ramp is 18 feet along the bottom 3 feet high. Find its slope.

$$\frac{\text{rise}}{\text{run}} = \frac{3}{18} = \frac{1}{6}$$

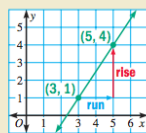


Slope of a Line

Given two points on a nonvertical line, you can find the slope m of the line using this formula:

$$m = \frac{\text{rise}}{\text{run}} = \frac{y_2 - y_1}{x_2 - x_1}$$

Example $m = \frac{4 - 1}{5 - 3} = \frac{3}{2}$



Comparing Slopes You can use the diagrams below to compare the slopes of different lines. Imagine that you are walking to the right.



Positive slope
If the line rises, the slope is *positive*.



Negative slope
If the line falls, the slope is *negative*.

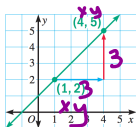


Zero slope
If the line is horizontal, the slope is *zero*.



Undefined slope
If the line is vertical, the slope is *undefined*.

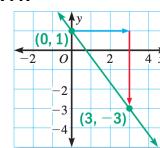
Find the slope of the line shown.



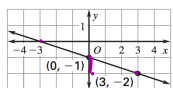
$$m = \frac{3}{3} = 1$$

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{5 - 2}{4 - 1} = \frac{3}{3} = 1$$

Find the slope of the line shown.



Find the slope of the line shown.



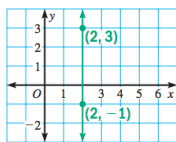
$$m = \frac{\text{rise}}{\text{run}} = \frac{-1}{3}$$

$$m = \frac{-2 - (-1)}{3 - 0} = \frac{-1}{3}$$

Find the slope of the line through the given points.

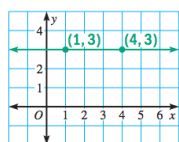
- ① (1, 2) (4, 7)
 $\frac{5}{3}$
- ② (-8, 5) (-6, -11)
 $\frac{y_2 - y_1}{x_2 - x_1} = \frac{5 - (-11)}{-8 - (-6)} = \frac{16}{-2} = -8$
- ③ (-5, 0) (7, 8)
 $\frac{8 - 0}{7 - (-5)} = \frac{8}{12} = \frac{2}{3}$

Find the slope of the line.



$$\frac{3 - (-1)}{2 - 2} = \frac{4}{0}$$

und.



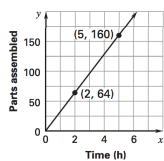
$$\frac{0}{3} = 0$$

Find the slope of the line through the given points. Tell whether the slope is *positive*, *negative*, *zero*, or *undefined*

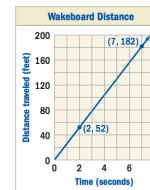
- (-12, -7) (4, 5) (6, 3) (6, -1)

- (-7, 4) (5, 4) (1, -5) (-4, 1)

The graph shows the number of parts assembled by a factory worker as a function of time. Find her assembly speed, in parts per hour.



The graph shows the distance traveled by a wakeboarder as a function of time. The slope of the line gives the wakeboarder's speed, which is the *rate of change* in distance traveled with respect to time. Find the wakeboarder's speed.



8.4 Homework

Pg. 423-425

#4 - 6 all, 8-16 (even),
17-21 all, 22-30 (4th),
35-37 all, 50, 52, 53