

INVESTIGATING SLOPE

LEARNING GOALS

Students will:

- Practice finding the slope, equation and midpoint of a line and the median of a triangle.

SLOPE

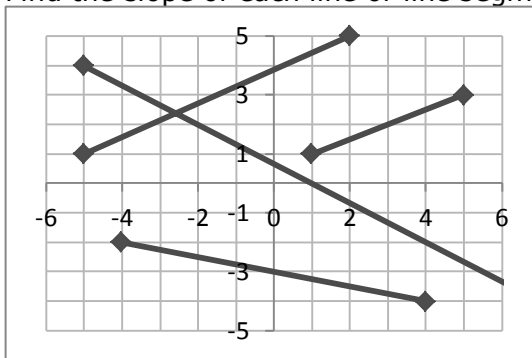
Slope of a Line

You can determine the slope, m , of a line from the coordinates of any two points, (x_1, y_1) and (x_2, y_2) , on the line:

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

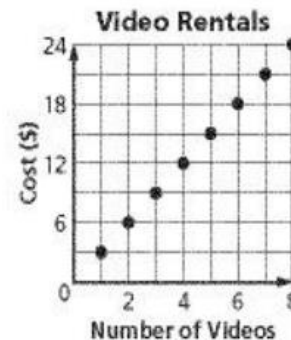
PRACTICE

1. Find the slope of each line or line segment. 2. Find the slope of the line through each pair of points.



- $(4, 6)$ and $(12, 10)$
- $(-4, 6)$ and $(12, 2)$
- $(-5, -4)$ and $(3, -8)$
- $(2.5, 6.4)$ and $(9.8, 7.6)$

3. A video store customer graphed her rentals versus her cost on the coordinate plane to the right. Find the slope of the line connecting the points. What does this represent?



LINES

Equation of a Line

- If you know the slope and y-intercept of a line, substitute these values directly into $y = mx + b$ to get an equation for the line.
- If you know the slope and the coordinates of a point on the line, substitute into $y = mx + b$ and solve for the y-intercept, b .
- If you know the coordinates of two points on the line, use these coordinates to calculate the slope. Then, use the slope and the coordinates of either point to solve for the y-intercept, b .

PRACTICE

4. Find an equation for the line that
- Has slope -2 and y-intercept 4
 - Has slope $\frac{2}{7}$ and y-intercept -14
 - Has slope 4 and passes through (6,3)
 - Has slope $-\frac{1}{2}$ and passes through (-2,4)
5. Find an equation for the line that passes through each pair of points
- A(1,1) and B(5,9)
 - C(-1,1) and D(-3,-2)
 - E(-4,1) and F(2,4)
 - G(5,-8) and H(-1,4)

PARALLEL AND PERPENDICULAR LINES

Parallel and Perpendicular Lines

- Parallel lines have equal slopes: $m_1 = m_2$
- The slopes of the perpendicular lines are negative reciprocals of each other: $m_2 = -1/m_1$.

PRACTICE

6. Find the slope of a line with each property.
- Parallel to the line defined by $y = 3x + 16$
 - Parallel to the line defined by $y = -\frac{1}{6}x + 5$
 - Perpendicular to the line defined by $y = -4x - 7$
 - Perpendicular to the line defined by $y = \frac{3}{4}x + 8$
7. Find an equation for the line that
- Is parallel to the line defined by $y = -3x + 1$ and passes through A(-3,5)
 - Is perpendicular to the line defined by $y = -\frac{3}{2}x - \frac{1}{2}$ and passes through B(2,3)
 - Is parallel to the line defined by $y = -\frac{3}{4}x - \frac{1}{2}$ and passes through C(-5,1)