Slope

Slope - a ratio describing the steepness of a line

also defined as rise or \( \Delta y = \frac{y_2 - y_1}{x_2 - x_1} \)
run

Examples: Find the slope for each.

1. \((-1, 4), (1, -2)\)
   \[
   m = \frac{-2 - 4}{1 - (-1)} = \frac{-6}{2} = -3
   \]

2. \((1, 3), (-2, -3)\)
   \[
   m = \frac{3 - (-3)}{1 - (-2)} = \frac{6}{3} = 2
   \]

\[\frac{2}{1} = \frac{-2}{-1}\]
Examples: Find the slope of each line.

3. (-3,2), (3,2)
   \[
   m = \frac{2-2}{3+3} = \frac{0}{6} = 0
   \]
   All horizontal \( m = 0 \)

4. (-2,3), (-2,-2)
   \[
   m = \frac{3+2}{-2+2} = \frac{5}{0} = \text{undefined (no slope)}
   \]
   All vertical \( m = \text{undefined} \)
Examples: Use the graph to find the slope.

5.

6.
Examples: Use the graph to find the slope.

7. \( m = 0 \)

8. \( m = \text{undefined} \)
Examples: Use the slope of the line to graph.

9. through \((-4, -3)\) slope = \(\frac{2}{3}\)  
10. through \((2, 5)\) slope = \(-2\)
Examples: Use the slope of the line to graph.

11. through (2,-3) slope = $-\frac{1}{4}$

12. through (3,4) slope = 0
Examples: Use the slope of the line to graph.

13. through (-2,-4), slope = undefined
There are 4 types of Slope.
Rate of Change - rate of change, slope plus the units of measure.
**TRAVEL**  Refer to the graph at the right. Find the rate of change of the number of people taking cruises from 1985 to 2000.

\[
\text{slope} = \text{rate of change} = \frac{y_2 - y_1}{x_2 - x_1} = \frac{6.9 - 2.2}{2000 - 1985} = \frac{4.7}{15} = 0.31 \text{ million per year}
\]
Assignment

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