2.2: Finding Slope and Rate of Change
"I WILL …
Apply the slope equation to find the rate of change."

I. Definitions

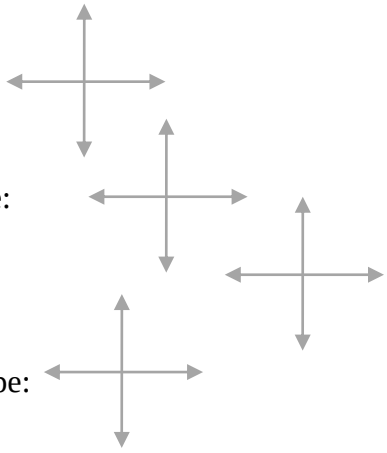
A. Linear equation: An equation whose graph is a line
B. Slope is a non-vertical line of the vertical change to the horizontal change between two points of a line
C. Y-intercept is where the line crosses the *y-axis*

II. Slope

A. Slope Equation is $m = \frac{y_2 - y_1}{x_2 - x_1}$
B. Rewrite the equation as $\frac{\Delta y}{\Delta x} = \frac{rise}{run}$
C. Rise: The number of points up (vertically) from the previous point
D. Run: The number of points sideways (horizontally) from the rise

III. Types of Slope

A. Positive Slope:
B. Negative Slope:
C. Zero Slope:
D. Undefined Slope:



E. Zero vs. Undefined "Heaven over Hell:"

IV. Steps

A. Find the change of *Y* and change of *X* of two of the points
B. Determine the ratios for both
C. Simplify the ratio
D. Repeat the process for two other points
E. Check answer

V. Model Problems

Ex 1: What is the slope of these two points, (–1, 3) and (2, –2)? Will it rise, fall, horizontal, or vertical?

Your Turn: What is the slope of this table? Will it rise, fall, horizontal, or vertical?

x	–2	0	2	4
$f(x)$	2	1	0	–1

Ex 2: What is the slope of this table? Will it rise, fall, horizontal, or vertical?

x	2	3	4	5
$f(x)$	2	4	8	16

Your Turn: What is the slope of these two points, (1, –5) and (1, 0)? Will it rise, fall, horizontal, or vertical?

Ex 3: What is the slope of these two points, $f(2) = 2$ and $f(6) = 8$? Will it rise, fall, horizontal, or vertical?

Ex 4: What is the slope of these two points, $f(a) = 3$ and $f(-2a) = 7$?

Your Turn: What is the slope of these two points, $f(2) = 8$ and $f(6) = 8$? Will it rise, fall, horizontal, or vertical?

Assignment: Page 86: 3-17 odd, 29-33 odd

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FINDING SLOPE Find the slope of the line passing through the given points. Then tell whether the line *rises*, *falls*, *is horizontal*, or *is vertical*.

3. (2, −4), (4, −1)
4. (8, 9), (−4, 3)
5. (5, 1), (8, −4)
6. (−3, −2), (3, −2)
7. (−1, 4), (1, −4)
8. (−6, 5), (−6, −5)
9. (−5, −4), (−1, 3)
10. (−3, 6), (−7, 3)
11. (4, 4), (4, 9)
12. (5, 5), (7, 3)
13. (0, −3), (4, −3)
14. (1, −1), (−1, −4)

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ERROR ANALYSIS *Describe* and correct the error in finding the slope of the line passing through the given points.

15. (−4, −3), (2, −1)

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

16. (−1, 4), (5, 1)

$$m = \frac{5-(-1)}{1-4} = -2$$

17. **TAKS REASONING** What is true about the line through (2, −4) and (5, 1)?

(A) It rises from left to right.
(B) It falls from left to right.
(C) It is horizontal.
(D) It is vertical.

FINDING SLOPE Find the slope of the line passing through the given points.

29. $\left(-1, \frac{3}{2}\right), \left(0, \frac{7}{2}\right)$
30. $\left(-\frac{3}{4}, -2\right), \left(\frac{5}{4}, -3\right)$
31. $\left(-\frac{1}{2}, \frac{5}{2}\right), \left(\frac{5}{2}, 3\right)$
32. (−4.2, 0.1), (−3.2, 0.1)
33. (−0.3, 2.2), (1.7, −0.8)
34. (3.5, −2), (4.5, 0.5)