

3-3 Rate of Change and Slope

$$\text{Rate of change} = \frac{\text{change in } y}{\text{change in } x}$$

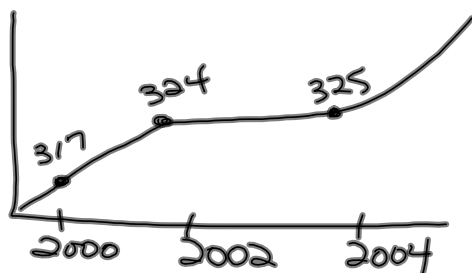
$$\text{Slope} \frac{\text{rise } \uparrow}{\text{run } \rightarrow}$$



x	y
3	48.
6	96
9	144

$$\frac{96-48}{6-3} = \frac{48}{3} = 16$$

$$\frac{144-96}{9-6} = \frac{48}{3} = 16$$



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

$$(\overset{x_1}{-2}, \overset{y_1}{0}) \quad (\overset{x_2}{1}, \overset{y_2}{5})$$

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

$$\frac{5 - 0}{1 - (-2)} = \frac{5}{3}$$

$$m = \frac{5}{3}$$

$$(-3, 4) \quad (2, -3)$$

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

$$m = -\frac{7}{5}$$

$$\frac{-3 - 4}{2 - (-3)} = \frac{-7}{5}$$

$2 + 3$

$$(-3, -1) \quad (2, -1)$$

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

$$\frac{-1 - (-1)}{2 - (-3)} = \frac{-1 + 1}{2 + 3} = \frac{0}{5} = 0$$

Zero slope horizontal line!
0 in the numerator

$$\frac{6}{4} = \frac{3}{2}$$

$$\frac{-16}{12} = \frac{-4}{3}$$

$$(-2, 4) \quad (-2, -3)$$

$$m = \frac{-3 - 4}{-2 - (-2)} = \frac{-7}{-2 + 2} = \frac{-7}{0}$$

undefined
vertical line

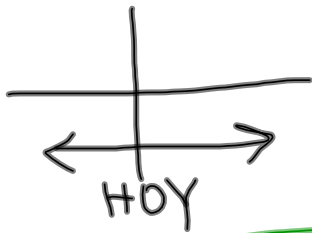
Zero in the
denominator!

H O Y

H = Horizontal

O = 0 slope

Y = Y axis

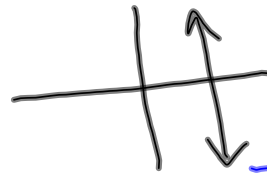
O in the numerator

V U X

V = vertical

U = Undefined

X = X axis

O in the denominator

36. $(12, 10), (-2, r), m = -4$

$$m = \frac{y_2 - y_1}{x_2 - x_1} \quad -4 = \frac{r - 10}{-2 - 12}$$

$$-14 \cdot -4 = \frac{r - 10}{-14} \cdot -14$$

$$56 = r - 10$$

$$\underline{66 = r}$$