IM1 – 06: Writing Linear Functions (Notes 6a) – Average Rate of Change

Average Rate of Change (ARoC) - the slope of the segment connecting two points. It is calculated as the change in y over (divided by) the change in x.

Slope Formula

- $$\frac{\Delta y}{\Delta x} = \frac{Change\ in\ y}{Change\ in\ x} = \frac{Rise\ (Vertical)}{Run\ (Horizontal)} = \frac{y_2 - y_1}{x_2 - x_1}$$

Steps to Calculate Slope

1. Identify two points as Point 1 & Point 2.

2. Label each point's coordinates as (x_1, y_1) for Point 1 and (x_2, y_2) for Point 2.

3. Substitute the coordinate values into the slope formula.

4. Simplify the expression.
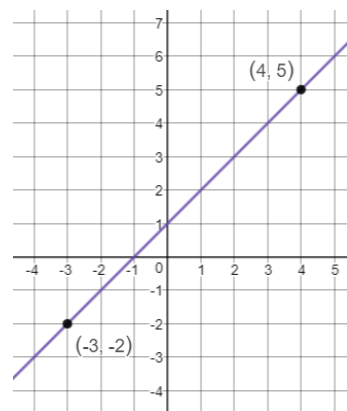
5. Reduce the fraction (if applicable).

Examples

- Point 1: $\overset{x_1, y_1}{(2, 4)}$ and Point 2: $\overset{x_2, y_2}{(6, 10)}$

$$m = \frac{\Delta y}{\Delta x} = \frac{y_2 - y_1}{x_2 - x_1} = \frac{10 - 4}{6 - 2} = \frac{6}{4} \div \left(\frac{2}{2}\right) = \frac{3}{2}$$

- Point 1: $\overset{x_1,\ y_1}{(-3, -2)}$ and Point 2: $\overset{x_2, y_2}{(4, 5)}$

$$m = \frac{\Delta y}{\Delta x} = \frac{y_2 - y_1}{x_2 - x_1} = \frac{5 - (-2)}{4 - (-3)} = \frac{5 + 2}{4 + 3} = \frac{7}{7} = 1$$

- Point 1: $\overset{x_1, y_1}{(-5, 8)}$ and Point 2: $\overset{x_2,\ y_2}{(3, -2)}$

$$m = \frac{\Delta y}{\Delta x} = \frac{y_2 - y_1}{x_2 - x_1} = \frac{-2 - 8}{3 - (-5)} = \frac{-10}{3 + 5} = \frac{-10}{8} \div \left(\frac{2}{2}\right) = -\frac{5}{4}$$

x	y
-5	8
-3	5.5
-1	3
1	0.5
3	-2
5	-4.5

IM1 – 06: Writing Linear Functions (Practice 6a) – Average Rate of Change

Practice – Calculate the slope for each problem. Show your work!
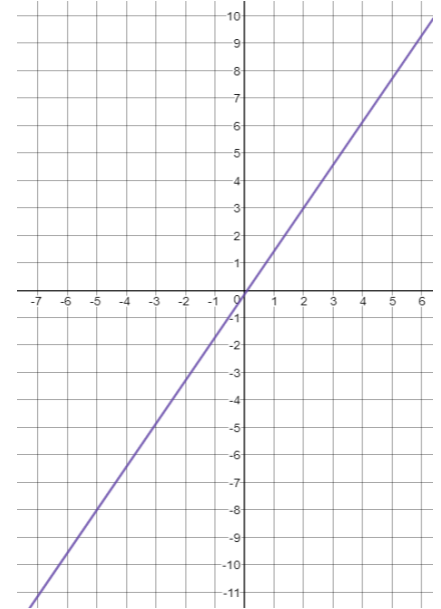
1. Point 1: $(1, 4)$ and Point 2: $(2, 7)$

2. Point 1: $(-7, 3)$ and Point 2: $(6, 1)$

3. Point 1: $(2, -5)$ and Point 2: $(5, 4)$

4. Point 1: $(-6, -2)$ and Point 2: $(3, 1)$

5. Point 1: $(-4, 5)$ and Point 2: $(6, -3)$

6. Choose two points on the graph and find the slope.

7. Choose two points from the table, and find the slope.

x	y
-2	1.2
-1	-0.4
0	-2
1	-3.6
2	-5.2