Comparing Average Rate of Change and Y-intercepts

Name_____ Period:_____ Date:_____

Directions: Use the information given to solve each problem.

1. David is comparing two linear functions.

- Linear function A can be represented by the equation y = 2x -5
- Some of the values of linear function B are shown in the table.

Function B

x	4	7	10
y	-8	1	10

Which statement about the functions is correct?

A. The rate of change of function B is greater than the rate of change of function A; the y-intercept of function B is greater than the y-intercept of function A.

B. The rate of change of function B is greater than the rate of change of function A; the y-intercept of function B is less than the y-intercept of function A.

C. The rate of change of function B is less than the rate of change of function A; the y-intercept of function B is greater than the y-intercept of function A.

D. The rate of change of function B is less than the rate of change of function A; the y-intercept of function B is less than the y-intercept of function A.

2. Mary is comparing two linear functions.

- Linear function A can be represented by the equation $y = 3x + 4$
- Some of the values of linear function B are shown in the table.

Function B

x	0	1	2
y	5	7	9

Which statement about the functions is correct?

A. The rate of change of function B is greater than the rate of change of function A; the y-intercept of function B is greater than the y-intercept of function A.

B. The rate of change of function B is greater than the rate of change of function A; the y-intercept of function B is less than the y-intercept of function A.

C. The rate of change of function B is less than the rate of change of function A; the y-intercept of function B is greater than the y-intercept of function A.

D. The rate of change of function B is less than the rate of change of function A; the y-intercept of function B is less than the y-intercept of function A.

3. Adam is comparing two linear functions.

- Linear function A can be represented by the equation $y = -x + 2$
- Some of the values of linear function B are shown in the table.

Function B

x	0	4	6
y	4	7	8.5

Which statement about the functions is correct?

A. The rate of change of function B is greater than the rate of change of function A; the y-intercept of function B is greater than the y-intercept of function A.

B. The rate of change of function B is greater than the rate of change of function A; the y-intercept of function B is less than the y-intercept of function A.

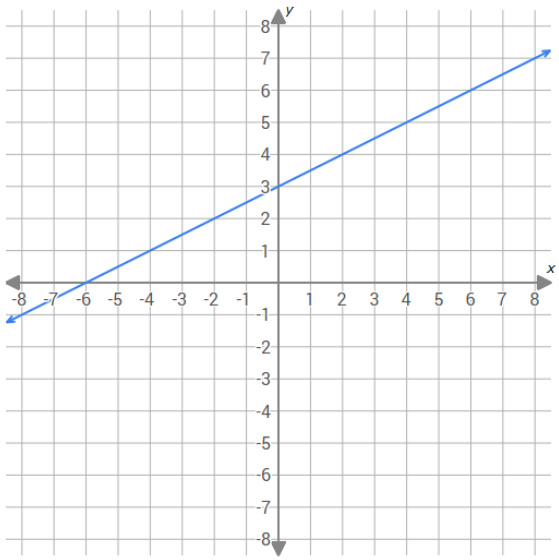
C. The rate of change of function B is less than the rate of change of function A; the y-intercept of function B is greater than the y-intercept of function A.

D. The rate of change of function B is less than the rate of change of function A; the y-intercept of function B is less than the y-intercept of function A.

4. Sarah is comparing two linear functions.

- Linear function A can be represented by the equation $y = 5x - 3$
- The graph of linear function B are shown below.

Function B



Which statement about the functions is correct?

A. The rate of change of function B is greater than the rate of change of function A; the y-intercept of function B is greater than the y-intercept of function A.

B. The rate of change of function B is greater than the rate of change of function A; the y-intercept of function B is less than the y-intercept of function A.

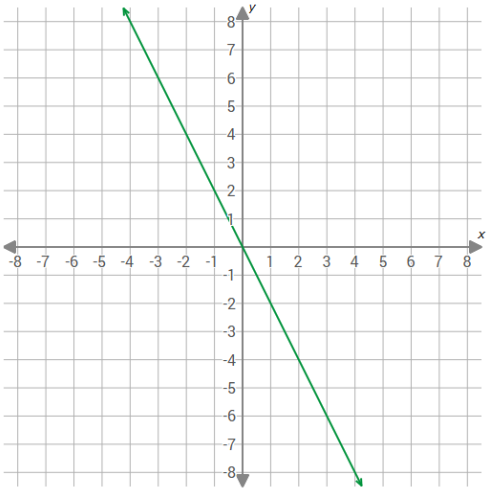
C. The rate of change of function B is less than the rate of change of function A; the y-intercept of function B is greater than the y-intercept of function A.

D. The rate of change of function B is less than the rate of change of function A; the y-intercept of function B is less than the y-intercept of function A.

5. Matthew is comparing two linear functions.

- Linear function A can be represented by the equation $y = -2x + 6$
- The graph of linear function B are shown below.

Function B



Which statement about the functions is correct?

A. The rate of change of function A and function B are the same;
the y-intercept of function B is greater than the y-intercept of function A.

B. The rate of change of function A and function B are the same;
the y-intercept of function B is less than the y-intercept of function A.

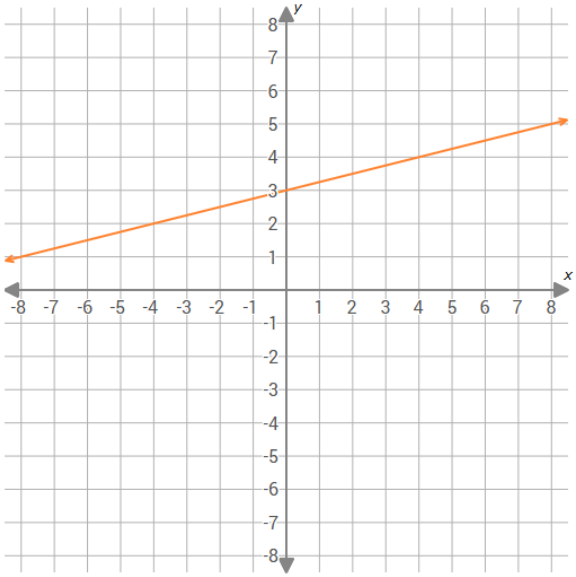
C. The rate of change of function B is less than the rate of change of function A;
the y-intercept of function B is greater than the y-intercept of function A.

D. The rate of change of function B is less than the rate of change of function A;
the y-intercept of function B is less than the y-intercept of function A.

6. John is comparing two linear functions.

- Linear function A can be represented by the equation $y = x + 1$
- The graph of linear function B are shown below.

Function B



Which statement about the functions is correct?

A. The rate of change of function B is greater than the rate of change of function A; the y-intercept of function B is greater than the y-intercept of function A.

B. The rate of change of function B is greater than the rate of change of function A; the y-intercept of function B is less than the y-intercept of function A.

C. The rate of change of function B is less than the rate of change of function A; the y-intercept of function B is greater than the y-intercept of function A.

D. The rate of change of function B is less than the rate of change of function A; the y-intercept of function B is less than the y-intercept of function A.

Answer Key

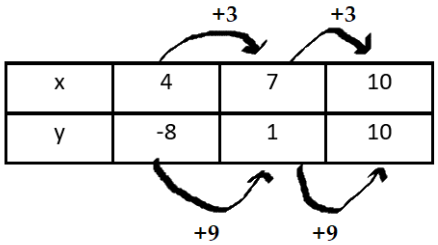
Problem 1—The correct answer is B.

Step 1: Analyze Function A

- The equation of function A is $y = 2x - 5$.
- **Rate of change (slope):** The coefficient of x is 2, so the rate of change of function A is **2**.
- **y-intercept:** The constant term is -5, so the y-intercept of function A is **-5**.

Step 2: Analyze Function B

The table for Function B is:



The slope of function B is $\frac{\Delta y}{\Delta x} = \frac{9}{3} = 3$

Step 2.2: Find the y-intercept of Function B

The equation of a linear function is $y = mx + b$. Using $m = 3$ and the point $(4, -8)$, substitute into the equation to solve for b:

$$\mathbf{y = mx + b}$$

$$-8 = 3(4) + b$$

$$-8 = 12 + b$$

$$b = -8 - 12 = -20$$

So, the y-intercept of Function B is **-20**.

Answer Key

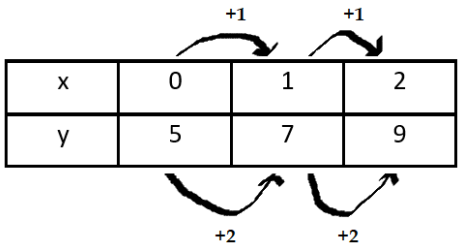
Problem 2—The correct answer is C.

Step 1: Analyze Function A

- The equation of function A is $y = 3x + 4$.
- **Rate of change (slope):** The coefficient of x is 3, so the rate of change of function A is **3**.
- **y-intercept:** The constant term is 4, so the y-intercept of function A is **4**.

Step 2: Analyze Function B

The table for Function B is:



The slope of function B is $\frac{\Delta y}{\Delta x} = \frac{2}{1} = 2$

Step 2.2: Find the y-intercept of Function B

The equation of a linear function is $y = mx + b$. Using $m = 2$ and the point $(0, 5)$, substitute into the equation to solve for b:

$$y = mx + b \quad \text{becomes} \quad 5 = 2(0) + b$$

$$b = 5$$

The y-intercept of Function B is **5**.

Answer Key

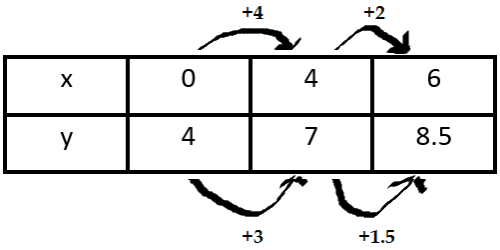
Problem 3—The correct answer is A.

Step 1: Analyze Function A

- The equation of function A is $y = -x + 2$.
- **Rate of change (slope):** The coefficient of x is -1, so the rate of change of function A is **-1**.
- **y-intercept:** The constant term is 2, so the y-intercept of function A is **2**.

Step 2: Analyze Function B

The table for Function B is:



x	0	4	6
y	4	7	8.5

The slope of function B is $\frac{\Delta y}{\Delta x} = \frac{3}{4} = \frac{1.5}{2} = 0.75$

Step 2.2: Find the y-intercept of Function B

The equation of a linear function is $y = mx + b$. Using $m = 0.75$ and the point $(0, 4)$:

$$y = mx + b \quad \text{becomes} \quad 4 = 0.75(0) + b$$

$$b = 4$$

The y-intercept of Function B is 4.

Answer Key

Problem 4—The correct answer is C.

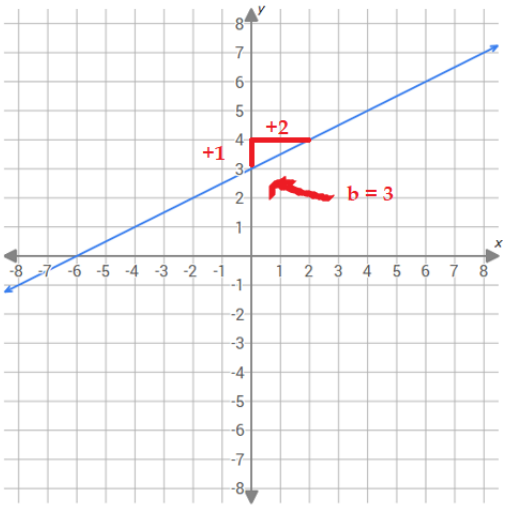
Step 1: Analyze Function A

The equation of Function A is:

$$y = 5x - 3$$

- **Rate of change (slope):** The coefficient of x is 5, so the rate of change of Function A is 5.
- **y-intercept:** The constant term is -3, so the y-intercept of Function A is -3.

Function B



Step 2: Analyze Function B (from the graph)

Step 2.1: Determine the rate of change (slope) of Function B

From the graph, we observe the following:

- When x increases by $+2$, y increases by $+1$. This gives the slope:

$$m = \frac{\Delta y}{\Delta x} = \frac{1}{2} = 0.5$$

The slope (rate of change) of Function B is 0.5.

Step 2.2: Determine the y-intercept of Function B

From the graph, the line intersects the y-axis at $y = 3$. Hence, the y-intercept of Function B is 3.

Step 3: Compare the Functions

- **Rate of change:**
  - Function A has a slope of 5.
  - Function B has a slope of 0.5.
  - $0.5 < 5$, so **the rate of change of Function B is less than the rate of change of Function A.**
- **y-intercept:**
  - Function A has a y-intercept of -3.
  - Function B has a y-intercept of 3.
  - $3 > -3$, so **the y-intercept of Function B is greater than the y-intercept of Function A.**

Answer Key

Problem 5—The correct answer is B.

Step 1: Analyze Function A

The equation of Function A is:

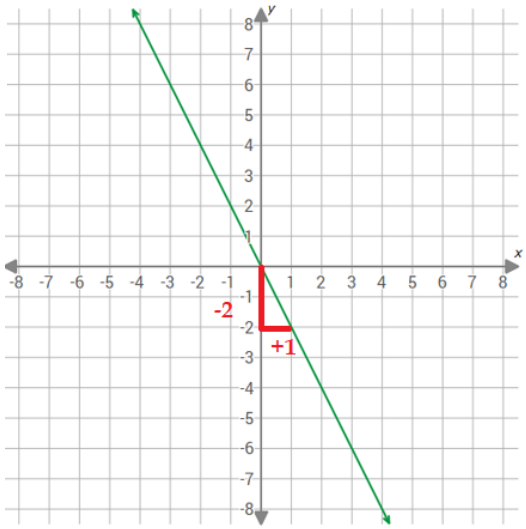
$$y = -2x + 6$$

- **Rate of change (slope):** The coefficient of x is -2, so the rate of change of Function A is -2.
- **y-intercept:** The constant term is 6, so the y-intercept of Function A is 6.

Step 2: Analyze Function B (from the graph)

Step 2.1: Determine the rate of change (slope) of Function B

From the graph:



The slope of function B is $\frac{\Delta y}{\Delta x} = \frac{rise}{run} = \frac{-2}{1} = -2$

Step 2.2: Determine the y-intercept of Function B

From the graph, the line intersects the y-axis at $y = 0$. Hence, the y-intercept of Function B is 0.

Step 3: Compare the Functions

- **Rate of change:**
  - Function A has a slope of -2.
  - Function B has a slope of -2.
  - The rate of change of both functions is **equal**.
- **y-intercept:**
  - Function A has a y-intercept of 6.
  - Function B has a y-intercept of 0.
  - $6 > 0$, so the **y-intercept of Function A is greater than the y-intercept of Function B**.

Answer Key

Problem 6—The correct answer is C.

Step 1: Analyze Function A

The equation of Function A is:

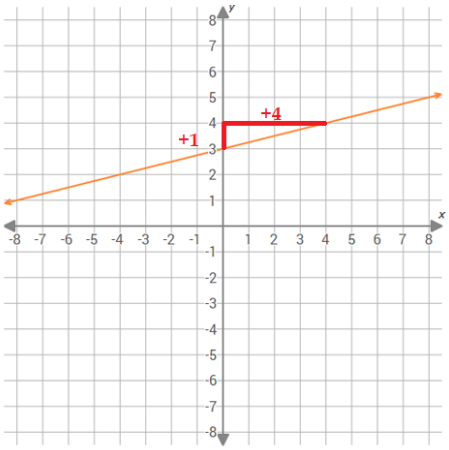
$$y = x + 1$$

- **Rate of change (slope):** The coefficient of x is 1, so the rate of change of Function A is 1.
- **y-intercept:** The constant term is 1, so the y-intercept of Function A is 1.

Step 2: Analyze Function B (from the graph)

Step 2.1: Determine the rate of change (slope) of Function B

From the graph:



The slope of function B is $\frac{\Delta y}{\Delta x} = \frac{rise}{run} = \frac{1}{4} = 0.25$

Step 3: Compare the Functions

- **Rate of change:**
  - Function A has a slope of 1.
  - Function B has a slope of 0.25
  - $1 > 0.25$, so the **rate of change of Function B is less than the rate of change of Function A.**
- **y-intercept:**
  - Function A has a y-intercept of 1.
  - Function B has a y-intercept of 3.
  - $3 > 1$, so the **y-intercept of Function B is greater than the y-intercept of Function A.**