Grade 8 Mathematics EOG (GSE) Quiz Answer Key

Functions - (MGSE8.F.2) Compare Properties Of 2 Functions

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Score: _____

1)

Company 2

# of text messages	Price ($)
0 - 100	5
101 - 200	10
201 - 300	15
301 - 400	20
401 - 500	25

Two companies offer different charges for text messaging. Company 1 charges $0.04 per text message, while Company 2 charges rates according to the table.

Which company offers the cheapest plan for up to 500 text messages?
A)   Company 1 because the cost of 500 text messages is $15.
B)   Company 1 because the cost of 500 text messages is $20.
C)   Company 2 because the cost of 500 text messages is $25.
D)   The costs for both plans are exactly the same for 500 text messages.

Explanation:
Company 1 because the cost of 500 text messages is $20. Company 2 charges $25.

2)

Function 1
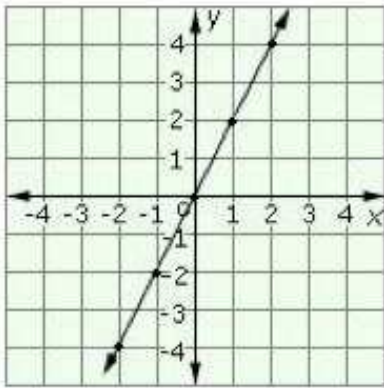
Function 2

The function whose input x and output y are related by

$$y = \frac{1}{2}x + 7$$

Consider the two functions shown here. Which function has the greater rate of change? Explain your answer.

A)   **Function 1, because the rate of change is 2.**

B)   Function 2, because the rate of change is ½.

C)   Function 2, because the rate of change is 7.

D)   Function 1, because the rate of change is ½ .

Explanation:
Function 1 because the rate of change is 2. If you determine the ratio of the rise to the run of function 1 the slope is 2. Function 2 has a slope of ½, which is less than 2.

3)

A	
x	**y**
1	1
2	4
3	9
4	16

C	
x	**y**
1	4
2	2
3	4/3
4	1

B	
x	**y**
1	1/2
2	1
3	3/2
4	2

D	
x	**y**
1	3
2	5
3	7
4	9

The tables show four relationships between x and y. In which table is there a NEGATIVE rate of change?

A)

B)

C)

D)

Explanation:
In table **C** the y-values fall as x increases, so the rate of change is negative.

4) Function 1: y = 4x + 5
Function 2: The line passing through the points (1, 6) and (3, 10).

Which of these functions has the greater rate of change?

A)   Function 1, because the slope is 5 and the slope of function 2 is 4.

B)   Function 1, because the slope is 4 and the slope of function 2 is 2.

C)   Function 2, because the slope is 7 and the slope of function 1 is 5.

D)   Function 2, because the slope is 5 and the slope of function 1 is 4.

Explanation:
Function 1, because the slope is 4 and the slope of function 2 is 2. Use the slope formula.

5)

Scenario 1

Traveling Time

Scenario 2
$y = 50x$
x is time in hours
y is distance in miles
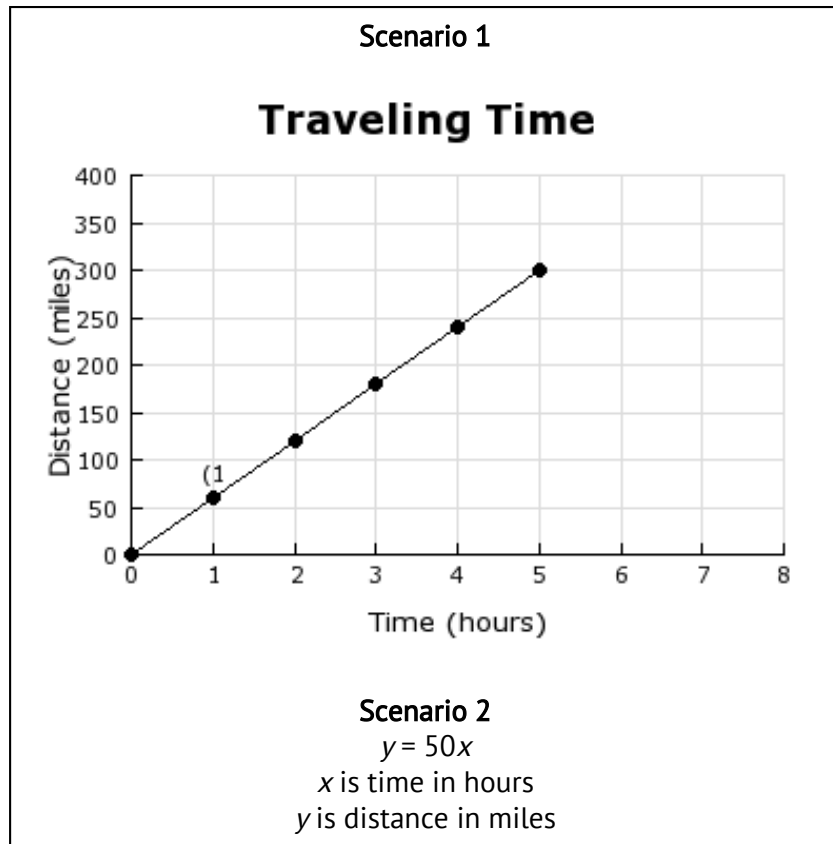
Compare the scenarios and determine which shows the greater speed.

- A) **Scenario 1 because the slope is 60.**
- B) Scenario 2 because the slope is 50.
- C) Scenario 1 because the slope is $\frac{1}{60}$.
- D) Scenario 2 because the slope is $\frac{1}{50}$.

Explanation:
Scenario 1 because the slope is 60. The slope for scenario 1 is 60, whereas the slope of the function in scenario 2 is 50 miles per hour.

6)
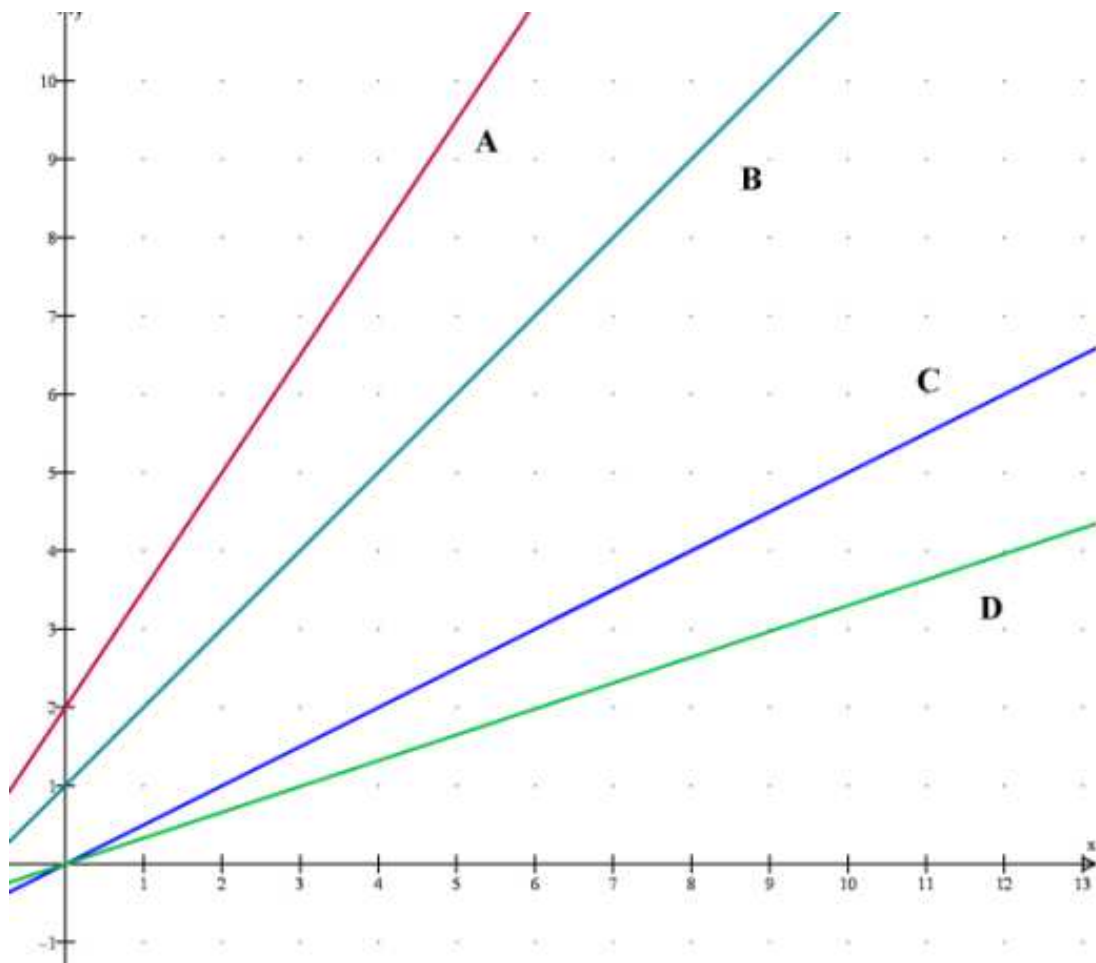
Of the four functions graphed here, which shows the GREATEST rate of change?

A)
B)
C)
D)

Explanation:
In line **A** the y-values are growing fastest.

7) A wheelchair ramp runs 36 inches and rises 3 inches. What is the rate of change?

A) $\dfrac{1}{12}$

B) 12

C) 33

D) 39

Explanation:

Since slope or rate of change is rise over run, we say $\dfrac{3}{36}$ which reduces to $\dfrac{1}{12}$.

8)

Company 2

# of text messages	Price ($)
0 - 100	5
101 - 200	10
201 - 300	15
301 - 400	20
401 - 500	25

Two companies offer different charges for text messaging. Company 1 charges $0.06 per text message, while Company 2 charges rates according to the table.

Which company offers the cheapest plan for 500 text messages?
   A)   **Company 2, because the other company would charge $30.**
   B)   Company 1, because the cost of 500 text messages is $25.
   C)   Company 2, because the cost of 500 text messages is $20.
   D)   Company 1, because the cost of each text message is only $0.06.

Explanation:
Company 2, because the other company would charge $30. Multiply to compare.

9) For every 6 boxes sold, Stephanie makes a profit of $8.10. Which table shows this same rate of change?

A

Number of Boxes	Profit
15	$20.25
17	$22.95
19	$25.65
21	$28.35

B

Number of Boxes	Profit
8	$10.80
10	$12.15
12	$13.50
14	$14.85

C

Number of Boxes	Profit
15	$13.25
17	$18.95
19	$21.65
21	$24.35

D

Number of Boxes	Profit
8	$14.85
10	$16.20
12	$17.55
14	$18.90

   A)   A
   B)   B
   C)   C
   D)   D

Explanation:

For every 1 box sold, Stephanie makes a profit of $1.35. **Table A** shows this same rate.

10) Which function represents a line with a slope of −4 and a y-intercept of −2?

A)   y = 4x − 2
B)   y = −4x + 2
C)   y = −4x − 2
D)   y = −2x − 4

Explanation:
y = −4x − 2 is correct.

y-intercept form: y = mx + b; m is the slope and b is the y-intercept

Substitute −4 in for m and −2 in for b.
y = −4x − 2

11) Are Functions 1 and 2 the same? Explain.

Function 1: y = 3(x + 5)
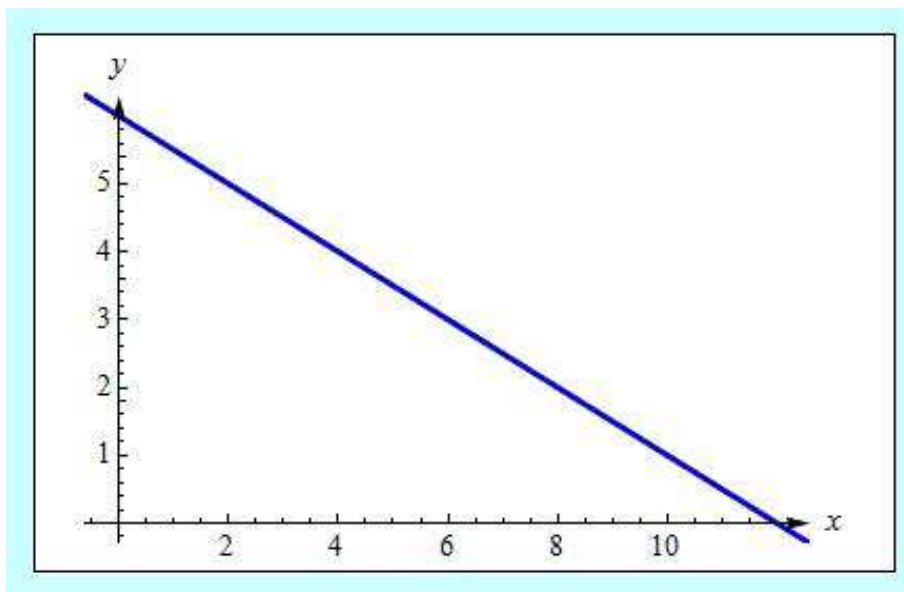Function 2: y equals three times x, plus 5.

A)   No, 3(x + 5) = 15x and "three times x, plus 5" would be 3x + 5.
B)   Yes, 3(x + 5) and "three times x, plus 5" are both equal to 15x.
C)   Yes, 3(x + 5) and "three times x, plus 5" are both equal to 3x + 5.
D)   No, 3(x + 5) = 3x + 15 and "three times x, plus 5" would be 3x + 5.

Explanation:
No, 3(x + 5) = 3x + 15 and "three times x, plus 5" would be 3x + 5.

12)

Which function is represented by the graph?

A)   f(x) = 2x + 6
B)   f(x) = -2x + 6

C) $f(x) = \dfrac{1}{2}x + 6$

D) $f(x) = -\dfrac{1}{2}x + 6$

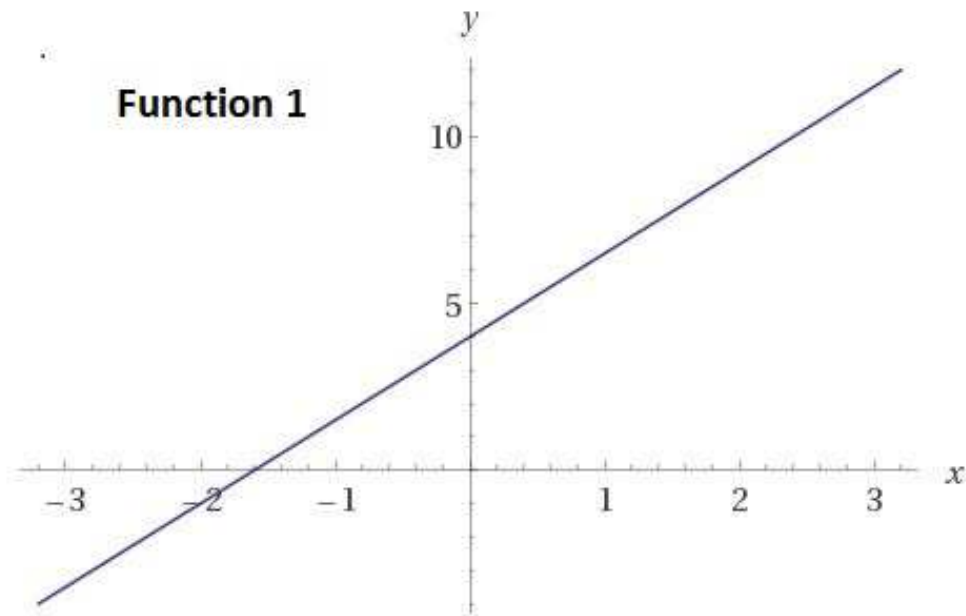### Explanation:
$f(x) = -\dfrac{1}{2}x + 6$ is correct. Determine the x intercept, set f(x) = 0 and solve for x; $-\dfrac{1}{2}x + 6 = 0$; x = 12. Determine the y intercept, set x =

0 to find f(0); f(0) = $-\frac{1}{2}$ x + 6 = 6. the graph of the function is a line passing through the points (12 , 0) and (0 , 6).

13)

Function 1

Function 2

x	y
2	11
3	14
4	17
5	20

Consider the two functions. Which statement is true?

A)   Function 1 has the greater y-intercept by 1 unit

B)   Function 2 has the greater y-intercept by 1 unit

C)   Function 1 has the greater y-intercept by $\frac{1}{2}$ unit

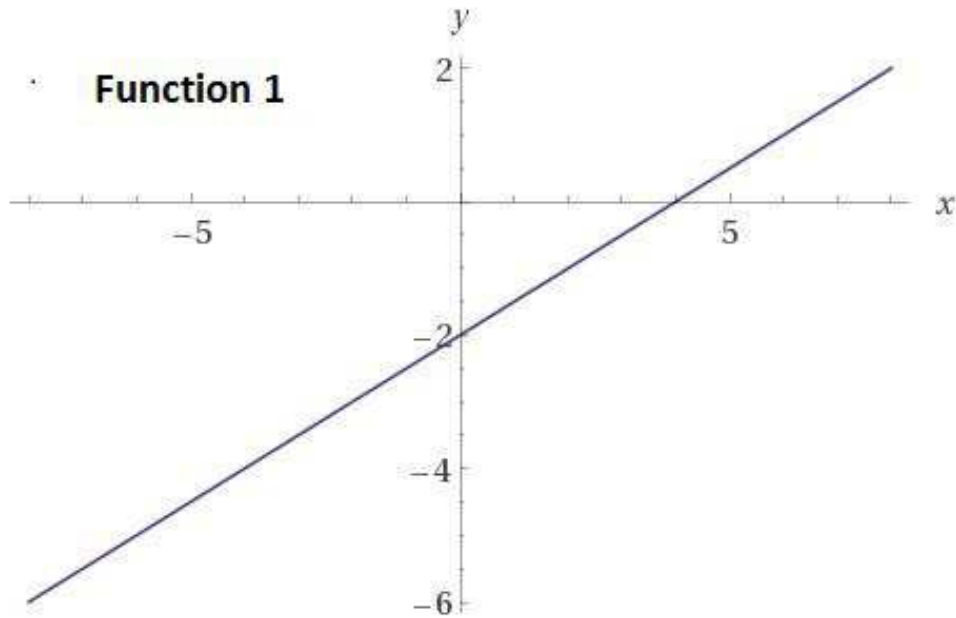D)   Function 2 has the greater y-intercept by $\frac{1}{2}$ unit

Explanation:
Function 2 has the greater y-intercept by 1 unit

Function 1 has a y-intercept of 4 and function 2 has a y-intercept of 5.

thus,

5 - 4 = 1

14)

Function 1

Function 2

$$y = \frac{3}{4}x - 2$$

Consider the two functions. Which statement is true?

A)   Function 1 has a greater rate of change by $\frac{1}{4}$

B)   Function 2 has a greater rate of change by $\frac{1}{4}$

C)   Function 1 has a greater rate of change by $\frac{1}{2}$

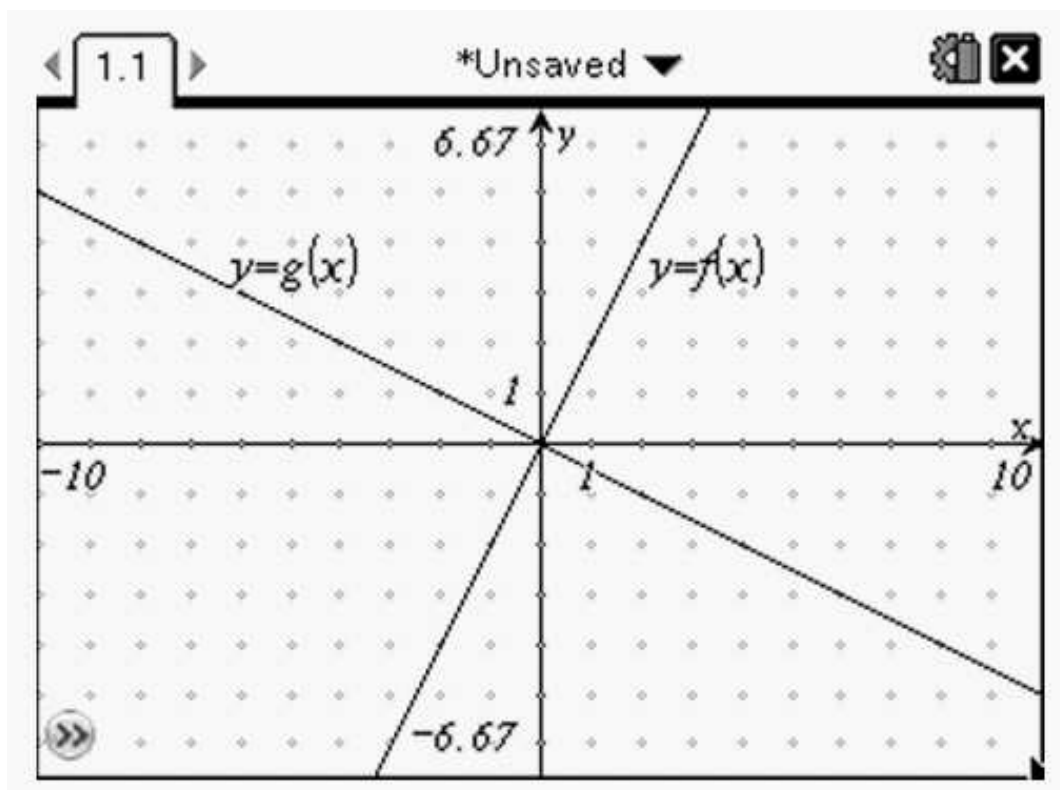D)   Function 2 has a greater rate of change by $\frac{1}{2}$

Explanation:

Function 2 has a greater rate of change by $\frac{1}{4}$

Function 1 has a slope of $\frac{1}{2}$ and Function 2 has a slope of $\frac{3}{4}$.

thus,

$$\frac{3}{4} - \frac{1}{2} = \frac{3}{4} - \frac{2}{4} = \frac{1}{4}$$

15)

Two functions are graphed. y = f(x) has a positive rate of change and y = g(x) has a negative rate of change. Ignoring the sign of the rate of change, who has a greater rate of change and by how much?

  A)   f(x) and g(x) have the same rate of change.
  B)   f(x) has a rate of change that is half that of g(x).
  C)   f(x) has a rate of change that is double that of g(x).
  D)   f(x) has a rate of change that is quadruple that of g(x).

Explanation:

Every increase by 1 unit on the x axis causes the y-values on f(x) to change by 2 units and the y-values on g(x) to only change by $\frac{1}{2}$

a unit. So since it will take g(x) 4 times as long to cover the same distance as f(x) the correct answer is **f(x) has a rate of change that is quadruple that of g(x).**

16) Joanne is charged a base rate of $40.00 each month for her cell service. She upgrades her phone and chooses to make 18 monthly payments of $25 to pay for her new Samsung. She must also pay 25 cents for each text that she sends. Which function represents Joanne's phone charges each month for the next 18 months?

    A)   y = .25x + 65
    B)   y = .25x + 40
    C)   y = .25x + 72
    D)   y = 25x + 40

Explanation:
y = .25x + 65 is correct.

monthly charges = .25 per text + 40 base charge + 25 equipment charge

Let x = numbers of texts sent and y = monthly charge

y = 0.25x + 65

17) Which function has the greatest rate of change?

    A)   y = 3x - 4
    B)   4y - 8x = 1
    C)   a line passing through points (2,6) and (3,10)
    D)   a line passing through points (5,−2) and (6, 4)
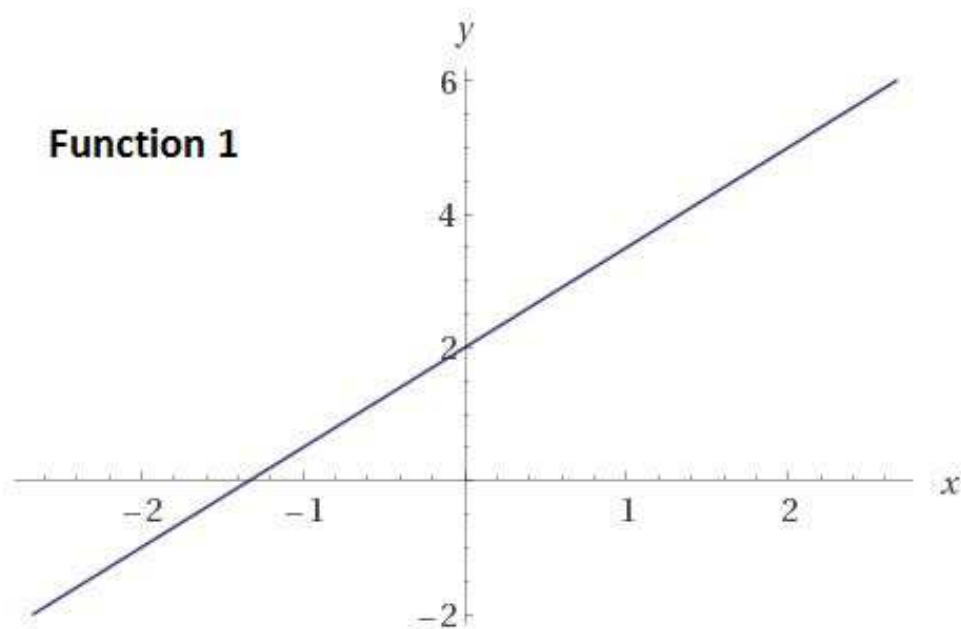
Explanation:
a line passing through points (5,−2) and (6, 4)

Step 1: Given equations should be in slope-intercept form
Step 2: Substitute given points of lines into slope formula.
Step 3: Compare slopes.

18)

Function 1

Function 2

x	y
2	3

3	5
4	7
5	9

Consider the two functions. Which statement is true?
- A)   Function 1 has the greater y-intercept by 1 unit
- B)   Function 2 has the greater y-intercept by 1 unit
- **C)   Function 1 has the greater y-intercept by 3 units**
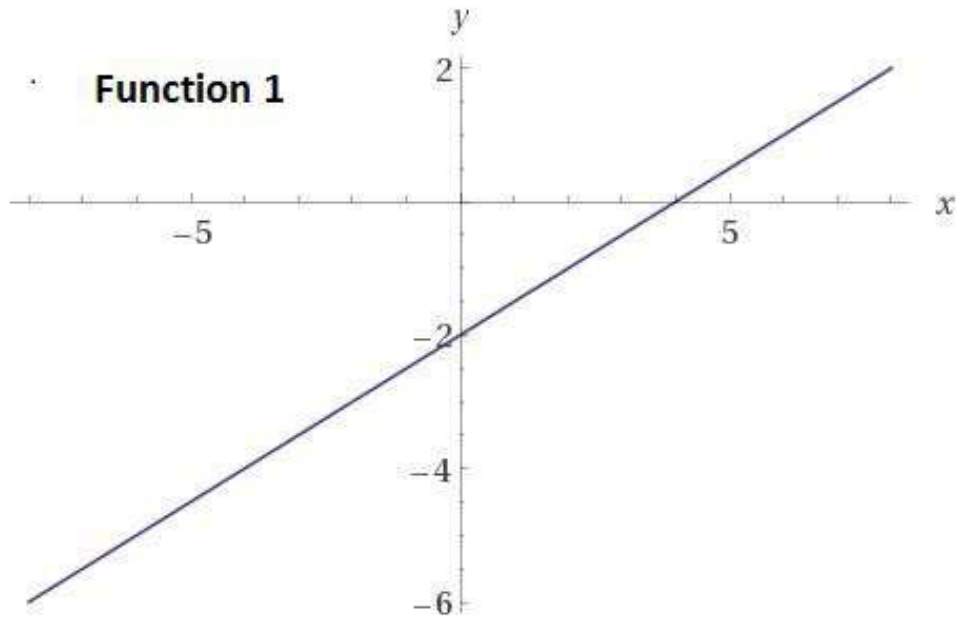- D)   Function 2 has the greater y-intercept by 3 units

Explanation:
Function 1 has the greater y-intercept by 3 units

Function 1 has a y-intercept of 2 and function 2 has a y-intercept of -1.

thus,

2 - (-1) = 2 + 1 = 3

19)

Function 2
$$y = \frac{15}{4}x - 4$$

Consider the two functions. Which statement is true?

A) Function 1 has a greater rate of change by $\frac{13}{4}$

B) Function 2 has a greater rate of change by $\frac{13}{4}$

C) Function 1 has a greater rate of change by $\frac{13}{2}$

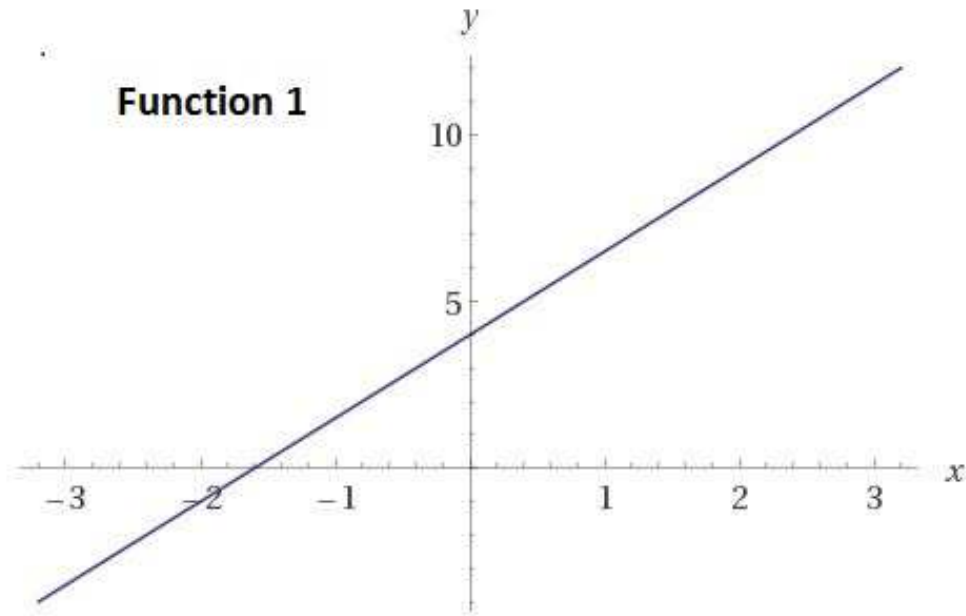D) Function 2 has a greater rate of change by $\frac{13}{2}$

Explanation:

Function 2 has a greater rate of change by $\frac{13}{4}$

Function 1 has a slope of $\frac{1}{2}$ and Function 2 has a slope of $\frac{15}{4}$.

thus,

$$\frac{15}{4} - \frac{1}{2} = \frac{15}{4} - \frac{2}{4} = \frac{13}{4}$$

20)

Function 1

Function 2

x	y
2	11
3	14
4	17
5	20

Consider the two functions. Which statement is true?

A)   Function 1 has the greater x-intercept by $\dfrac{1}{15}$ unit

B)   Function 2 has the greater x-intercept by $\dfrac{1}{15}$ unit

C)   Function 1 has the greater x-intercept by $\dfrac{1}{5}$ unit

D)   Function 2 has the greater x-intercept by $\dfrac{1}{5}$ unit

Explanation:

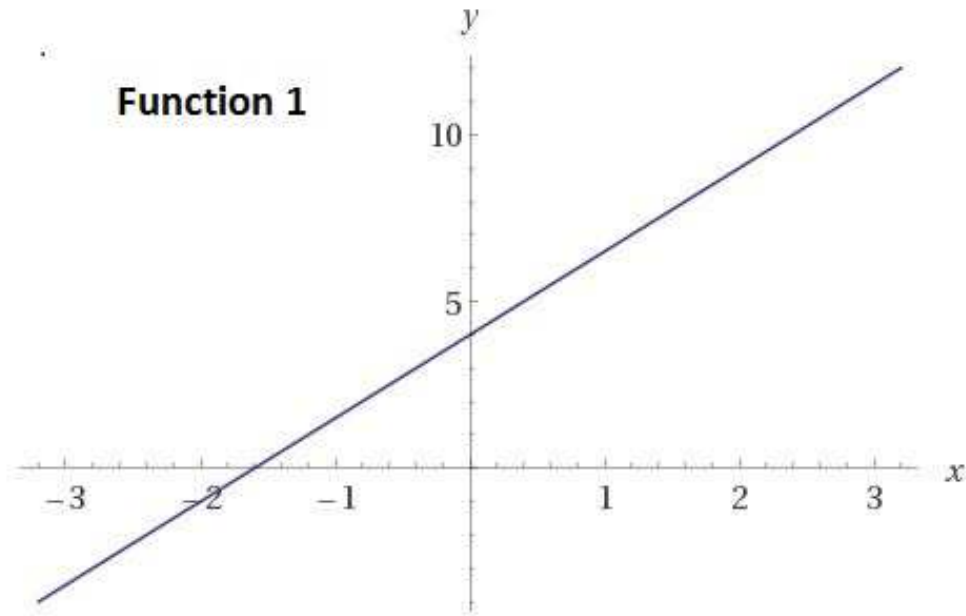**Function 2 has the greater x-intercept by $\dfrac{1}{15}$ unit**

function 1 has a x-intercept of $-\dfrac{8}{5}$ and function 2 has a x-intercept of $-\dfrac{5}{3}$.

thus,

$-\dfrac{8}{5} - (-\dfrac{5}{3}) = -\dfrac{24}{15} + \dfrac{25}{15} = \dfrac{1}{15}$

$-\dfrac{8}{5} - (-\dfrac{5}{3}) = -\dfrac{24}{15} + \dfrac{25}{15} = \dfrac{1}{15}$

21)

Function 1

Function 2

X	y
2	11
3	14
4	17
5	20

Consider the two functions. Which statement is true?

- A) Function 1 has a greater rate of change by 2
- B) Function 2 has a greater rate of change by 2
- C) Function 1 has a greater rate of change by $\frac{1}{2}$
- **D) Function 2 has a greater rate of change by $\frac{1}{2}$**
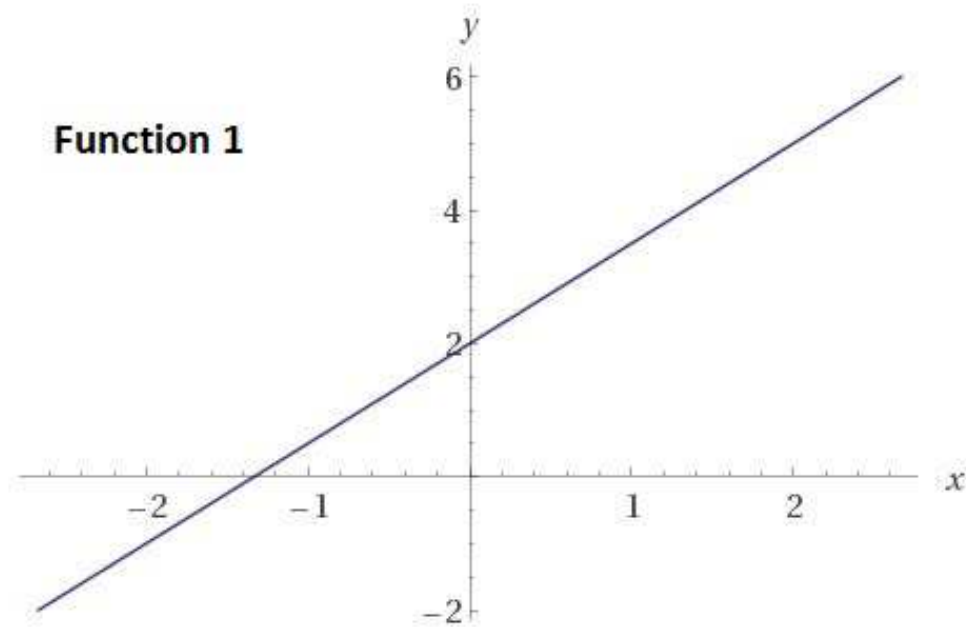
Explanation:

Function 2 has a greater rate of change by $\frac{1}{2}$

Function 1 has a slope of $\frac{5}{2}$ and Function 2 has a slope of 3.

thus,

$3 - \frac{5}{2} = \frac{6}{2} - \frac{5}{2} = \frac{1}{2}$

22)

Function 1

Function 2

x	y
2	3
3	5
4	7
5	9

Consider the two functions. Which statement is true?

  A)   Function 1 has a greater rate of change by 2
  B)   Function 2 has a greater rate of change by 2
  C)   Function 1 has a greater rate of change by $\dfrac{1}{2}$

  D)   **Function 2 has a greater rate of change by $\dfrac{1}{2}$**

Explanation:

Function 2 has a greater rate of change by $\dfrac{1}{2}$

Function 1 has a slope of $\dfrac{3}{2}$ and Function 2 has a slope of 2.

thus,

$2 - \dfrac{3}{2} = \dfrac{4}{2} - \dfrac{3}{2} = \dfrac{1}{2}$

23) The product of the slopes of perpendicular lines is −1. Which function represents a line that is perpendicular to $y = -6x + 7$?
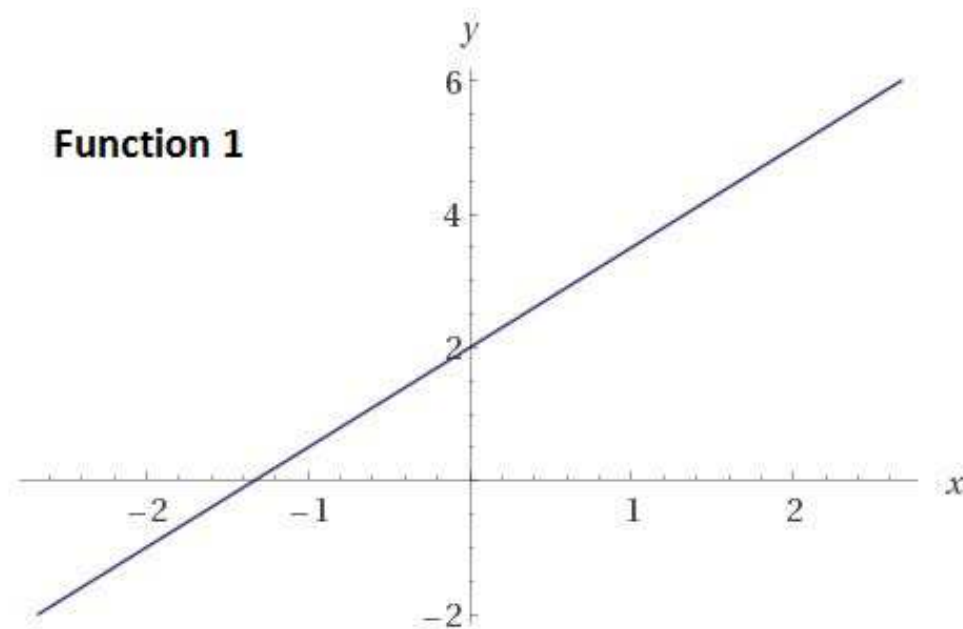 A) $y = 6x + 2$

B) $y = \dfrac{1}{6}x + 4$

C) $y = -x - 3$

D) $y = -\dfrac{1}{6}x + 7$

Explanation:

$y = \dfrac{1}{6}x + 4$ is correct.

$(-6)(\dfrac{1}{6}) = -1$

24)

Function 1

Function 2

x	y
2	3
3	5
4	7
5	9

Consider the two functions. Which statement is true?

A)   Function 1 has the greater x-intercept by $\frac{1}{2}$ unit

B)   Function 2 has the greater x-intercept by $\frac{1}{2}$ unit

C)   Function 1 has the greater x-intercept by $\frac{9}{5}$ unit

D)   **Function 2 has the greater x-intercept by $\frac{9}{5}$ unit**

Explanation:

Function 2 has the greater x-intercept by $\frac{11}{6}$ unit

Function 1 has a x-intercept of $-\frac{13}{10}$ and function 2 has a x-intercept of $\frac{1}{2}$.

$$\frac{1}{2} - (-\frac{13}{10}) = \frac{5}{10} + \frac{13}{10} = \frac{18}{10} = \frac{9}{5}$$