Functions:

The graph shows John’s trip to school. He walks to Sam’s house and, together, they ride a bus to school. The bus stops once on the way to school. Describes how each section A – E of the graph relates to the story.

E

Distance Away From Home

D

C

B

A

Time

Increasing\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Decreasing\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Constant\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Find (*f*(-3)) = \_\_\_\_\_\_\_\_\_\_\_\_\_

Find (*f*(2)) = \_\_\_\_\_\_\_\_\_\_\_\_\_

**Let *f*(x) be the function graphed below.**



**Vocabulary**

A relation can be represented by a set of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

The domain is the set of all \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

The range is the set of all \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

The independent variable is the same as the \_\_\_-values and the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

The dependent variable is the same as the \_\_\_-values and the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

A relation is a function if for each \_\_\_-value there is exactly \_\_\_\_\_\_ \_\_\_-value.

Each value in the domain of a function is called an \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, and the corresponding value for the range is called an \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| x | -4 | 1 | -2 | 1 |
| y | -3 | 2 | 5 | 0 |

1. { (1, -3), (3, -3 ), (0, 5), (-2, 1), (-4, 3) } 2.

Domain: (x-values) { } Domain: (x-values) { }

Range: (y-values) { } Range: (y-values) { }

Is this a function? \_\_\_\_\_\_\_\_\_\_\_ Is this a function? \_\_\_\_\_\_\_\_\_\_\_

When given a graph or picture of a relation and asked if it is a function the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is used. This test helps you to know a relation is a function by looking to see if any \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ line drawn does not intersect the graph at more than one point.

It is a one to one function when every element of the range of the function corresponds to exactly \_\_\_\_\_\_ element of the domain. y = *f*(x) is a function if it passes the \_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_ \_\_\_\_\_\_\_\_. It is a 1-1 function if it passes both the \_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_ and the \_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_ .

|  |  |
| --- | --- |
| x | y |
| 1 | 1 |
| -2 | 4 |
| 3 | -2 |
| -2 | 1 |

-2

-1

1. {(1, 2), (2, 3), (-3, 1), (4, 5), (0, -2) } 2. 3.

-1

-3

0

4

-6

2

What is the inverse of each?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Is it a Function? \_\_\_\_\_\_\_\_\_\_ Is it a Function? \_\_\_\_\_\_\_\_\_\_ Is it a Function? \_\_\_\_\_\_\_\_\_\_

Is the inverse a function? \_\_\_\_\_ Is the inverse a function? \_\_\_\_\_ Is the inverse a function? \_\_\_\_\_

.

Is it one to one? \_\_\_\_\_\_ Is it one to one? \_\_\_\_\_\_ Is it one to one? \_\_\_\_\_\_

4. You landed a job making $8.00 an hour and the following graph represents your earnings over a 5 hour

 shift. Unfortunately, you have to stop and put $12 in your car for gas. You get home after an hour.

 Let’s look at the graph.

|  |  |
| --- | --- |
| Hour | Earning |
| 1 | 8 |
| 2 | 16 |
| 3 | 24 |
| 4 | 32 |
| 5 | 40 |
|  |  |

A. Which variable is the independent variable? \_\_\_\_\_\_\_\_\_\_\_\_

B. Which variable is the dependent variable? \_\_\_\_\_\_\_\_\_\_\_\_\_

C. Does this represent a function? \_\_\_\_\_\_\_\_\_\_\_\_\_\_

Let’s graph your earnings for your day. Let’s look at the graph after getting gas.

Earnings

Earnings

1

2

3

4

5

Hours

Hours

Find *f*(-3) = \_\_\_\_\_ *f*(8) = \_\_\_\_\_ *f*(0) = \_\_\_\_\_

5. {(0,2),(3, -6), (-3, 1), (4, 5), (0, -2), (8,-1)}

Function Notation: If the graph is a function we can use *f*(x) instead of y

 Ex: y = 3x – 4 so *f*(x) = 3x – 4

 If *g*(x) = 3x + 2 *f*(x) = 2x – 3 *p*(x) = -3x – 5

Find: *g*(3) = *f*(-1) = *p*(-2) =

 *g*(-1) = *f*(4) = *p*(3) =

 *g*(-5) = *f*(1/2) = *p*(2/3) =

Linear Equation: an equation whose graph is a line, may have one or two variables.

 Ex: Linear Not

Slopes or Rate of Change:

Slope: steepness, ratio of changing vertically to changing horizontally.

**Slope Formula:**

Ex: (3,-5) and (6,8) Ex: (2,-1) and (6,-3) Ex: (1,-3) and (-2,0)

Graph y = mx + b m = slope (rate of change) b = y – intercept (where we cross the y-axis)

1. y = 3x – 2 2. y = -2x + 1 3. y = $\frac{1}{2}$x + 4

  

**Slope Formula:** $m= \frac{y2-y1}{x2-x1}$

Ex: (-1, 6) and (3, 8) $ m= \frac{8-(6)}{3-(-1)}= \frac{2}{4}$$= \frac{1}{2}$

Ex: (-2, -4) and (3, 11) $ m= \frac{11-(-4)}{3-(-2)}= \frac{15}{5}$$= \frac{3}{1}$

|  |  |
| --- | --- |
| x | y |
| 1 | -4 |
| 3 | -8 |
| 5 | -12 |

Ex:

 $ m= \frac{-8-(-4)}{3-(1)}= \frac{-4}{2}$$= \frac{-2}{1}$

 $ m= \frac{-12-(-8)}{5-(3)}= \frac{-4}{2}$$= \frac{-2}{1}$

**Find the slope using the Slope Formula:** $m= \frac{y2-y1}{x2-x1}$

1. (2, 6) and (4, 8) 2. (4, -1) and (6, -3) 3. (-1, 3) and (-2, 0)

Find the slope of the given line.

4. slope = 5. slope = 6. slope =

  

7. slope = 8. slope = 9. slope =

  

10. If *g*(x) = 3x + 1 11. *f*(x) = 2x – 4 12. *p*(x) = -3x – 1

Find: *g*(2) = *f*(-1) = *p*(-2) =

 *g*(-1) = *f*(4) = *p*(3) =

SLOPE-INTERCEPT FORM y = mx + b

m is the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ b is the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Write the equation of a line **given the slope** and **y-intercept**.

Write the equation of the line with the given slope and y-intercept.

1. Slope is -2 and a y-intercept of 5 2. Slope is $\frac{3}{4}$ and y-intercept is -3

Write the equation of a line in slope intercept form given a graph.

3. 4.

  

Slope: \_\_\_\_\_\_\_\_\_\_\_ Slope: \_\_\_\_\_\_\_\_\_\_\_

y-intercept: \_\_\_\_\_\_\_\_\_\_\_ y-intercept: \_\_\_\_\_\_\_\_\_\_\_

Equation: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Equation: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

|  |  |  |  |
| --- | --- | --- | --- |
| x | y = 3x + 1 | *f*(x) = 3x + 1 | (x, y) |
| 2 |  | *f*(2) = |  |
| 0 |  | *f*(0) = |  |
| -1 |  | *f*(-1) = |  |

5. y = 3x + 1

 Slope \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 y-intercept\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Classwork: Graph



|  |  |  |  |
| --- | --- | --- | --- |
| x | y = 2x – 1 | *f*(x) = 2x – 1 | (x, y) |
| 2 |  | *f*(2) = |  |
| 1 |  | *f*(1) = |  |
| 0 |  | *f*(0) = |  |
| -1 |  | *f*(-1) = |  |

1. y = 2x – 1

 What is the slope of the equation? \_\_\_\_\_\_\_\_\_\_\_

 What is the y – intercept ? \_\_\_\_\_\_\_\_\_\_\_\_



|  |  |  |  |
| --- | --- | --- | --- |
| x | y = -3x + 2 | *f*(x) = -3x + 2 | (x, y) |
| 2 |  | *f*(2) = |  |
| 1 |  | *f*(1) = |  |
| 0 |  | *f*(0) = |  |
| -1 |  | *f*(-1) = |  |

2. y = -3x + 2

 What is the slope of the equation? \_\_\_\_\_\_\_\_\_\_\_

 What is the y – intercept ? \_\_\_\_\_\_\_\_\_\_\_\_



|  |  |  |  |
| --- | --- | --- | --- |
| x | y = $\frac{1}{2}$x – 3 | *f*(x) = $\frac{1}{2}$x – 3 | (x, y) |
| 2 |  | *f*(2) = |  |
| 0 |  | *f*(0) = |  |
| -2 |  | *f*(-2) = |  |
| -4 |  | *f*(-4) = |  |

3. y = $\frac{1}{2}$x – 3

 What is the slope of the equation? \_\_\_\_\_\_\_\_\_\_\_

 What is the y – intercept ? \_\_\_\_\_\_\_\_\_\_\_\_



|  |  |  |  |
| --- | --- | --- | --- |
| x | y = $-\frac{1}{3}$x + 1 | *f*(x) = $-\frac{1}{3}$x + 1 | (x, y) |
| 3 |  | *f*(3) = |  |
| 0 |  | *f*(0) = |  |
| -3 |  | *f*(-3) = |  |

4. y = $-\frac{1}{3}$x + 1

 What is the slope of the equation? \_\_\_\_\_\_\_\_\_\_\_

 What is the y – intercept ? \_\_\_\_\_\_\_\_\_\_\_\_