White-Boards

Functions and Models

Lesson 3.1-3.4

Example 1

Function:	Not a function:
Input Output	Input Output

Function:
Input   Output

1 → 3
2 → 6
4 → 7
5 → 9

Each input value is paired with one

Not a function:
Input   Output

1 → 3
2 → 6
4 → 7
→ 9

The input 2 has more than one

Example 2

Function:		Not a function:	
Input	Output	Input	Output
2	5	2	5
3	8	2	8
4	6	4	6

Each input is unique.   Each input is not unique.

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1 Example

Determine if each relationship is a function.

1. Input   Output

2 → 5
4 → 8
5 → 6
8 → 4

○ Yes ○ No

2. Input   Output

3 → 5
7 → 8
9 → 6
→ 4

○ Yes ○ No

3. Input   Output

3
6 → 1
7
9 → 4

○ Yes ○ No

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2 Example

Determine if each relationship is a function.

4.

Input	Output
6	4
8	6
6	6

○ Yes ○ No

5.

Input	Output
4	4
2	6
8	8

○ Yes ○ No

6 ⟨ 4 , 6

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3 Example

What's the Error? Abram said the table at the right does not show a function. Explain the error.

_____

_____

Input	Output
3	2
5	2
7	2

Example 3

Linear Function:

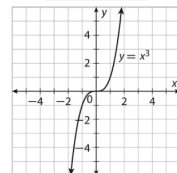$y = x - 2$
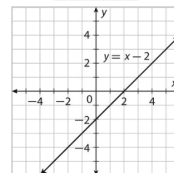
A straight line is formed.

Nonlinear Function:

$y = x^3$

A straight line is not formed.

Example 4

Examples of Linear Functions:

$y = x + 3$
$y = 3x$
$y = \dfrac{x}{3}$
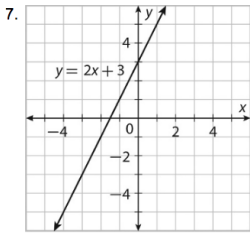$y = 3 - x$
$y = -3x$

Examples of Nonlinear Functions:

$y = \dfrac{3}{x}$
$y = 3x^2$
$x = 3$

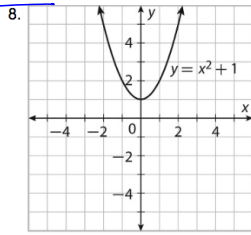**4** Example

Determine if each graph represents a linear function.

7.

$y = 2x + 3$

○ Yes   ○ No

8.

$y = x^2 + 1$

○ Yes   ○ No

5 Example

Determine if each equation represents a linear function.

9. $y = 4x + 1$

○ Yes   ○ No

10. $y = \dfrac{2}{3}x \Rightarrow \dfrac{2x}{3}$

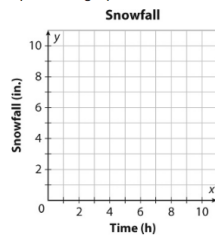○ Yes   ○ No

11. $y = x^2 + 4$

○ Yes   ○ No

6 Example

The equation $y = 2x$ represents the total amount of snow that fell during a storm.

12. Complete the table.

Snowfall

Time (hours)	Amount of Snow (in.)
0	
1	
2	
3	
4	
5	

13. Complete the graph.

Snowfall

7 Example

What is the value of $f(x) = \dfrac{1}{2}x + 5$ when $x = 4$?

A $\dfrac{9}{2}$

B   7

C   9

D   13

$f(4) = \dfrac{1}{2}(4) + 5$

$= 2 + 5$

$f(4) = 7$

$f(x) = \dfrac{x}{3} - 5, \quad x = 0$

$f(0) = -5$

8 Example

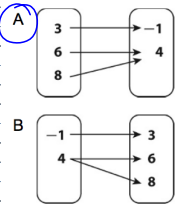A car uses a gallon of gas for every 45 miles driven. What is the dependent variable?

A   the number of cars

B   the number of gallons of gas

C   the cost of gas per gallon

What is the range of the following set of points: $\{(3, 4), (7, -2), (11, -8)\}$?
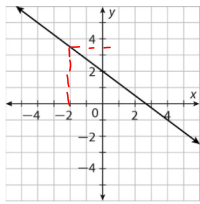
A $\{3, 7, 11\}$

B $\{-8, -2, 3, 4, 7, 11\}$

C $\{-8, -2, 4\}$

9 Example

Which mapping diagram represents a function?

A
| 3 → −1 |
| 6 → 4 |
| 8 → |

B
| −1 → 3 |
| 4 → 6 |
| → 8 |

The graph of $f(x)$ is shown. What is the value of $f(x)$ when $x = -2$?
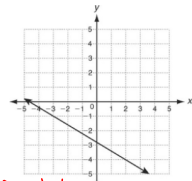
A −2
B 1
C $3\frac{1}{2}$ *(circled)*

10 Example

Fernando makes $17 an hour at work. Which function could represent his pay for each day of work?

A $f(x) = x + 17$
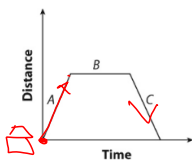B $f(x) = 17x$ *(circled)*
C $f(x) = 17 - x$

Explain if the graph shown represents a function.

*(handwritten)* yes, b/c each x has one y value or pass vertical line Test

11 Example

The graph represents Joe's distance from home over time on his walk. What is happening at the part of the graph labeled "A"?

A Joe is stopped.
B Joe is walking away from home. *(circled)*
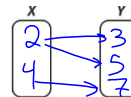C Joe is walking towards home.
D Joe is slowing down.

The graph represents the distance Ed has walked from his house. What is happening at the part of the graph labeled "B"?
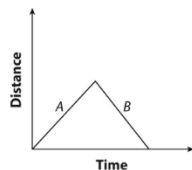
A Ed is walking away from his house.
B Ed is walking towards his house. *(circled)*
C Ed is standing still.

12 Example

a. Fill in a mapping diagram for the points (2, 3), (2, 5), and (4, 7).

| X | Y |
| 2 → 3 |
| 4 → 5 |
| → 7 |

b. Could the points represent a function? Explain why or why not.

(handwritten) No a func. b/c 2 has 2 outputs

What is the domain of the set $\{(-3, 5), (2, 0), (7, -5)\}$?

A $\{-5, 7\}$
B $\{-5, 0, 5\}$
C $\{-3, 2, 7\}$

13 Example

What is the range of $\{(0, 4), (-1, 5), (2, -7)\}$?

(handwritten) −7, 4, 5

Is the relation shown in the table a function?

| x | 1 | 4 | 5 | 10 |
| y | 2 | −1 | −6 | −1 |

(handwritten) Function

14 Example

Daniela bought a car for $24,000. Each year the value of the car decreases by $1750.

a. Write a function that shows the value of the car after y years.
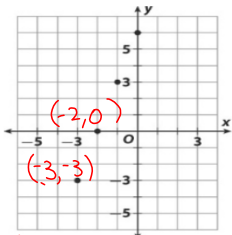
(handwritten) $f(y) = 24000 - 1750y$

Which function situation would have a discrete graph?

A amount of juice in a jug over time
B the cost of a given number of handbags
C area of a field based on length
D the price of computers over time

15 Example

at is the domain of the relation shown
he graph?

(-2,0)

(-3,-3)

-3,-2,-1,0

For the function
$\{(0, 1), (1, -3), (2, -4), (-4, 1)\}$

a. Write the domain of the function.

D: {-4, 0, 1, 2

b. Write the range of the function.

R: {-4 -3, 1}