

NAME:

DATE:

KEY

STUDY
GUIDE

A2.Q1.BERMELLEMO:

FUNCTIONS

(DAY F6)

REVIEW NOTES

A **function** is a special pairing of inputs and outputs where every input has exactly one output.

♦ A function can be presented as a **formula**: $y = f(x)$

EXAMPLE: $f(x) = 3x + 6$

EXAMPLE: $f(x) = \begin{cases} 2x+4 & \text{if } x \geq 1 \\ 4+x & \text{if } x < 1 \end{cases}$

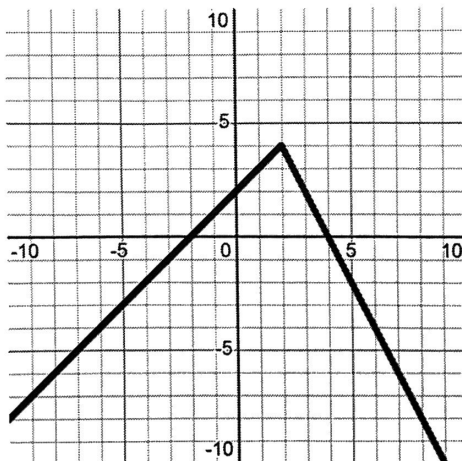
♦ A function can be presented as a **table of values**: (*input* = x , *output* = y)

EXAMPLE: Consider the table of values for the function $y = f(x)$.

x	y
-5	0
-3	1
-2	2
-1	4
0	7
1	6
2	0
3	-2

♦ A function can be presented as a **graph** $y = f(x)$: (*input* = x -axis, *output* = y -axis)

EXAMPLE: consider the graph of $y = f(x)$ below.



1. EVALUATE: This means find the output for a given input.

A: $f(x) = 3x + 6$

Evaluate $f(-3)$

$$f(-3) = 3(-3) + 6 = \boxed{-3}$$

Evaluate $f(2)$

$$f(2) = 3(2) + 6 = \boxed{12}$$

B: $f(x) = \begin{cases} 2x+4 & \text{if } x \geq 1 \\ 4+x & \text{if } x < 1 \end{cases}$
 ← use the top equation when input greater than or equal to 1.
 ← use the bottom equation when input is less than 1.

Evaluate $f(-3)$

$$f(-3) = 4 + (-3) = \boxed{1}$$

Evaluate $f(2)$

$$f(2) = 2(2) + 4 = \boxed{8}$$

C: Consider the table of values for the function $y = f(x)$.

x	y
-5	0
-3	1
-2	2
-1	4
0	7
1	6
2	0
3	-2

input = x
↓
Evaluate $f(-3)$

$$f(-3) = \boxed{1}$$

↑
output = y

input = x
↓
Evaluate $f(2)$

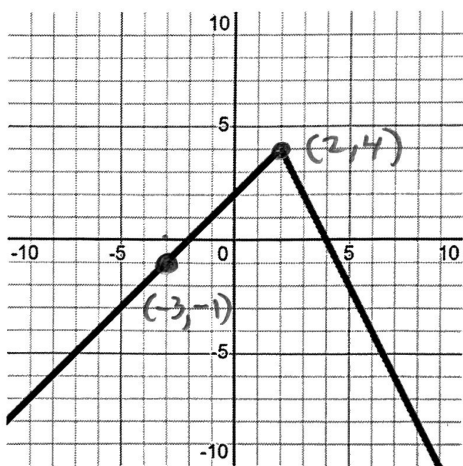
$$f(2) = \boxed{0}$$

↑
output = y

D: consider the graph of $y = f(x)$ below.

Evaluate $f(-3)$

Evaluate $f(2)$



$$f(-3) = \boxed{-1}$$

$$f(2) = \boxed{4}$$

2. Y-INTERCEPT : This is an output for the input = 0.

A: $f(x) = 3x + 6$ Find the y-intercept. Justify with function notation.

$$f(0) = 3(0) + 6 = \boxed{6}$$

B: $f(x) = \begin{cases} 2x + 4 & \text{if } x \geq 1 \\ 4 + x & \text{if } x < 1 \end{cases}$ Find the y-intercept. Justify with function notation.

$$f(0) = 4 + (0) = \boxed{4}$$

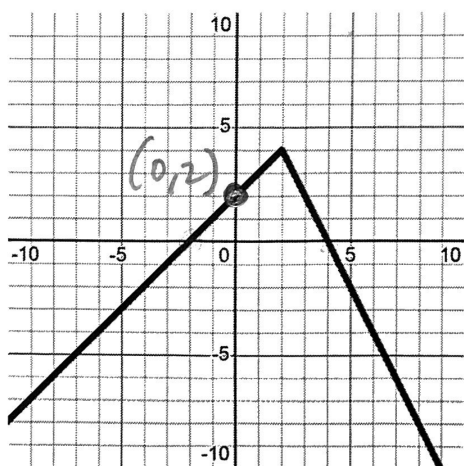
C: Consider the table of values for the function $y = f(x)$.

x	y
-5	0
-3	1
-2	2
-1	4
0	7
1	6
2	0
3	-2

Find the y-intercept. Justify with function notation.

$$f(0) = \boxed{7}$$

D: Consider the graph of $y = f(x)$ below. Find the y-intercept. Justify with function notation.



$$f(0) = \boxed{2}$$

3. ZERO OF A FUNCTION : This is a special input that makes output = 0

A: $f(x) = 3x + 6$. Determine if $x = -2$ is a zero. Justify with function notation.

TEST: $f(-2) = 3(-2) + 6 = 0$

YES, OUTPUT = 0

B: $f(x) = \begin{cases} 2x + 4 & \text{if } x \geq 1 \\ 4 + x & \text{if } x < 1 \end{cases}$. Determine if $x = -2$ is a zero. Justify with function notation.

TEST: $f(-2) = 4 + (-2) = 2$

NO, output $\neq 0$

C: Consider the table of values for the function $y = f(x)$.

x	y
-5	0
-3	1
-2	2
-1	4
0	7
1	6
2	0
3	-2

Determine if $x = -2$ is a zero. Justify with function notation.

TEST $f(-2) = 2$

NO, OUTPUT $\neq 0$

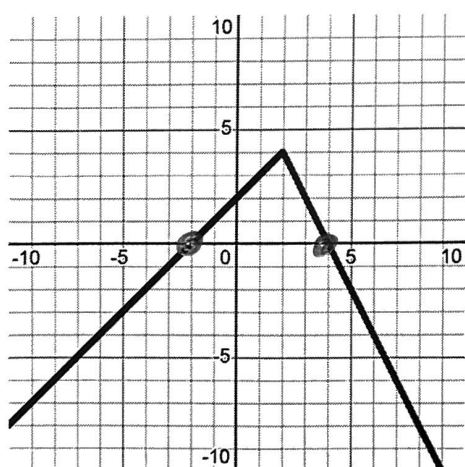
What are the zero(s) of the function? Justify.

$x = -5$ or $x = 2$

$f(-5) = 0 \checkmark$

$f(2) = 0 \checkmark$

D: Consider the graph of $y = f(x)$ below.



Determine if $x = -2$ is a zero of the function. Justify with function notation.

TEST: $f(-2) = 0 \checkmark$

YES, OUTPUT = 0

What are the zero(s) of the function? Justify.

$x = -2$ or $x = 4$

$f(-2) = 0 \checkmark$

$f(4) = 0 \checkmark$

4. FIND X WITH GIVEN OUTPUT

A: $f(x) = 3x + 6$ Determine the value of x where $f(x) = 2$. $\leftarrow \text{output} = 2$

$\downarrow$

$$2 = 3x + 6$$

$$-4 = 3x$$

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

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

C: Consider the table of values for the function $y = f(x)$.

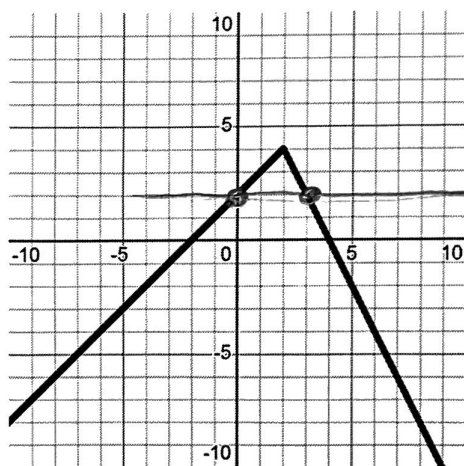
x	y
-5	0
-3	1
-2	2
-1	4
0	7
1	6
2	0
3	-2

Determine the value of x where $f(x) = 2$. $\leftarrow \text{output} = 2$

$$x = -2$$

$$f(-2) = 2 \checkmark$$

D: consider the graph of $y = f(x)$ below. Determine the value of x where $f(x) = 2$. $\leftarrow \text{output} = 2$

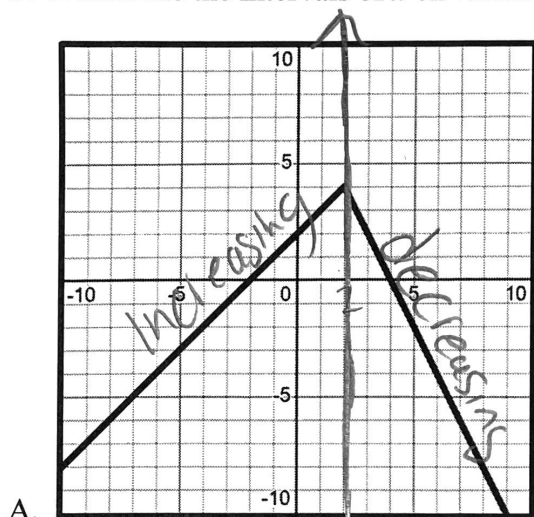


$$x = 0 \quad \text{or} \quad x = 3$$

$$f(0) = 2 \checkmark$$

$$f(3) = 2 \checkmark$$

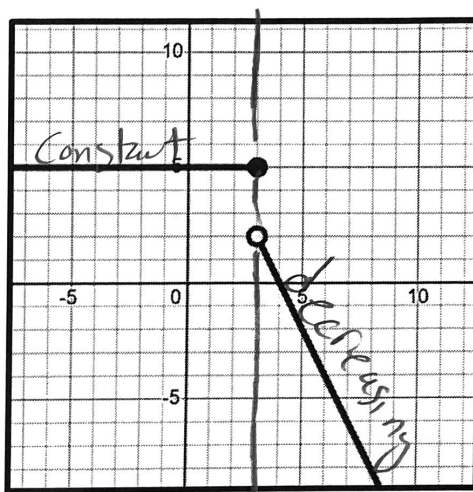
5. Determine the intervals of x on which the function is increasing, decreasing, and constant.



A.

$x < 2$

$x > 2$



B.

$x < 3$

$x > 3$

Increasing : $x < 2$
 decreasing : $x > 2$
 Constant : never

Increasing : never
 decreasing : $x > 3$
 Constant : $x < 3$

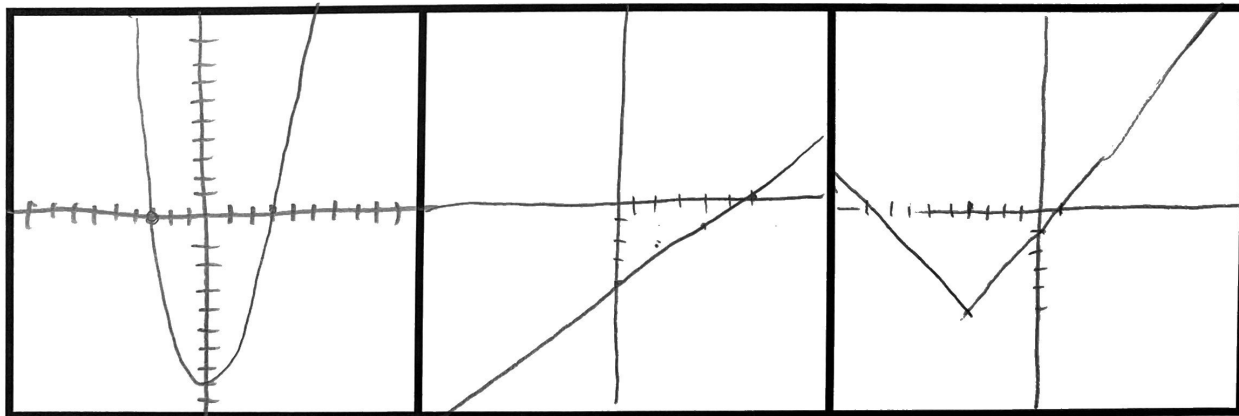
5. Use the TI84 calculator to make a quick sketch of the graph of each function.

Show a table of values for each.

A. $f(x) = x^2 - 9$

B. $f(x) = \frac{1}{2}x - 4$

C. $f(x) = |x + 4| - 5$



parabola

x	y

Pick
some

line

x	y

Pick
some

V. shape

x	y

Pick
some