

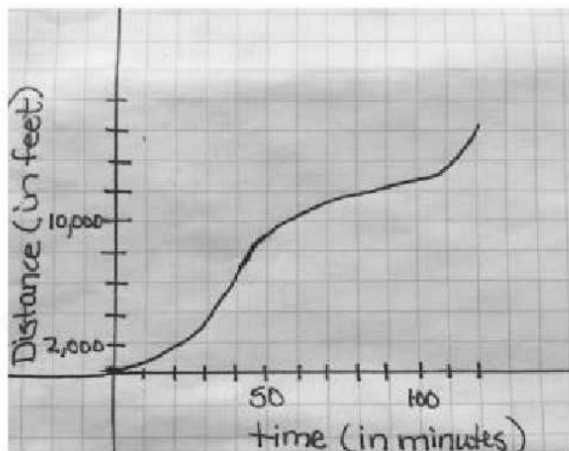
Floating Down the River

Alonzo, Maria and Sierra were floating in inner tubes down a river. Alonzo noticed that sometimes the water level was higher in some places than in others. Maria noticed there were times they seemed to be moving faster than at other times. Sierra laughed and said, "Math is everywhere!" To learn more about the river, Alonzo and Maria collected data throughout the trip.

Alonzo's table:

Time (mins)	Depth (ft)
0	4
10	6
20	8
30	10
40	6
50	5
60	4
70	5
80	7
90	12
100	9
110	6.5
120	5

Maria's graph:



Sierra looked at the data collected by her two friends and made several of her own observations. Explain why you agree or disagree with each observation made.

- a) The depth of the water increases and decreases throughout the 120 minutes of floating down the river.

agree b/c fable goes up & down

- b) The distance traveled is always increasing.

- c) The distance traveled is a function of time.

- d) The distance traveled is greatest during the last ten minutes of the trip than during any other ten minute interval of time.

- e) The domain of the distance/time graph is all real numbers.

- f) The y-intercept of the depth of water over time function is (0,0).

- g) The distance traveled increases and decreases over time.
- h) The depth of the water is never 11 feet.
- i) The range of the distance/time graph is from 0 feet to 15000 feet ($0 \leq f(x) \leq 15000$).
- j) The domain of the depth of water with respect to time is from 0 minutes to 120 minutes. ($0 \leq x \leq 120$)
- k) The range of the depth of the water over time is from 4 feet to 5 feet. ($4 \leq f(x) \leq 5$)
- l) The distance/time graph has no maximum value.
- m) The depth of water reached a maximum at 30 minutes.

Features of Functions

Domain: a set of all x -values (input, independent values)

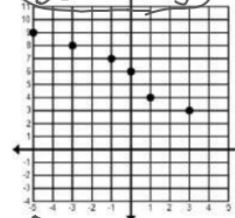
Range: a set of all y -values (output, dependent values)

Increasing: as the x -values get larger the y -values increase.

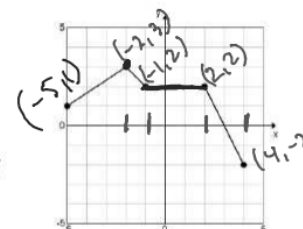
Decreasing: as the x -values get larger the y -values decrease.

Ex. 1: Describe where the graphs are increasing and decreasing.

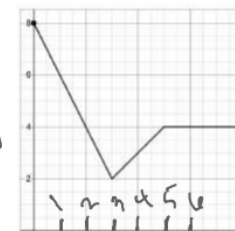
Decreasing or inc.



Decreasing for
all of the
Domain



Decreasing:
 $-2 < x < -1$
AND
 $2 < x < 4$
Increasing:
 $-5 < x < -2$



Decreasing:
 $0 < x < 3$
Increasing:
 $3 < x < 5$

X-intercepts: The place where the function crosses the x -axis.

* or the values of x when $y=0$

Y-intercepts: The place where the function crosses the y -axis

* OR the value of y when $x=0$

Minimum:

* The lowest point on the graph

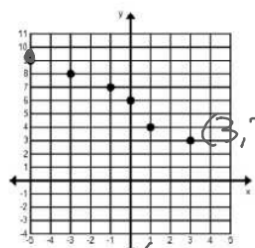
* The smallest y -value

Maximum:

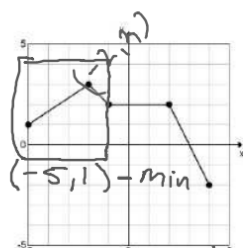
* The highest point (Apex) on the graph

* The largest y -value.

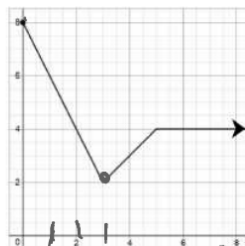
Ex. 4: Identify the minimums and maximums for each graph.



min: $(3, 3)$
max: $(-5, 9)$



min: $(4, -2)$
max: $(-2, 4)$



min: $(3, 2)$
max: $(0, 8)$

Continuity: if the function is Discrete or Continuous

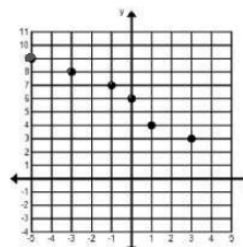
Discrete: A function where you have to lift your pencil to graph. (dots)

* finite # of points

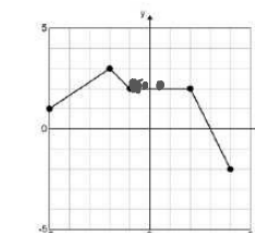
Continuous: A function where you don't lift your pencil to graph.

* Infinite # of points

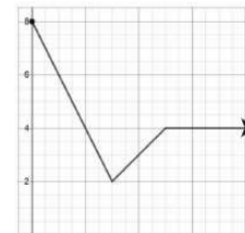
Ex. 2: Describe the Continuity for each graph.



Discrete



Continuous



Continuous



Discrete

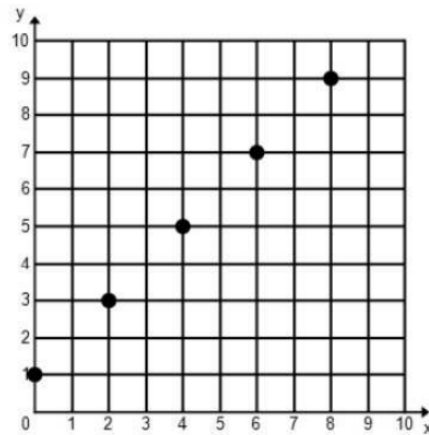
Ex. 3:Domain: $\{0, 2, 4, 6, 8\}$ Range: $\{1, 3, 5, 7, 9\}$

Increasing or Decreasing?

x-intercepts: None

y-intercepts: $(0, 1)$ Minimum: $(0, 1)$ Maximum: $(8, 9)$

Continuity: Discrete

**Ex 4:** Jesse takes a ride in a taxi. The fair starts at \$5 and increases with the miles driven. This is illustrated in the graph.

Domain:

$$x \geq 0$$

Range: $y \geq 5$

Increasing or Decreasing?

