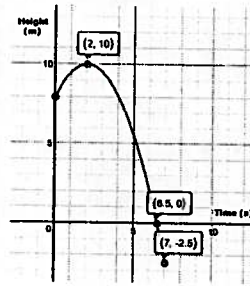


Functions - Properties - 01

1. A rock is thrown from the top of a cliff by the sea. The graph shows the height of the rock as a function of the time since it was thrown



- a) For how long was the rock observed?

6.5 sec

- b) What was the maximum and minimum height observed?

max = 10 min = -2.5

- c) What is the zero of this function and what does it mean in concrete terms?

6.5 sec, ^{time} rock hits sea level

- d) What is the initial value and what does it mean in concrete terms?

8m, height of cliff

- e) Over what interval was the rock on an upward trajectory?

$[0, 2]$

- f) Over what interval was the rock on a downward trajectory?

$[2, 7]$

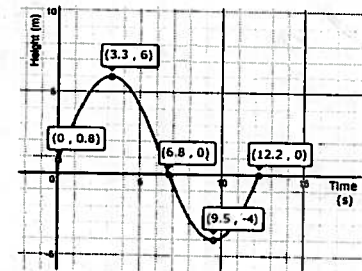
- g) Over what interval did the rock possess a positive height value?

$[0, 6.5]$

- h) Over what interval did the rock possess a negative height value?

$[6.5, 7]$

2. A roller coaster takes ride-goers above the park and under the ground. The graph shows the height of the passengers as a function of time since it was thrown



- a) What is the domain of the function?

$[0, 12.2]$

- b) What is the range of the function?

$[-4, 6]$

- c) What are the zeros of the function and what do they represent in concrete terms?

6.8, 12.2 sec

- d) What is the initial value and what does it mean in concrete terms?

0.8m, height of coaster ^{Time} roller coaster is at ground level

- e) Over what interval was the coaster on an upward trajectory?

$[0, 3.3] \cup [9.5, 12.2]$

- f) Over what interval was the coaster on a downward trajectory?

$[3.3, 9.5]$

- g) Over what interval did the coaster possess a positive height value?

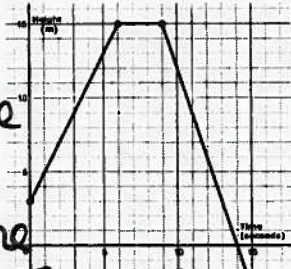
$[0, 6.8]$

- h) Over what interval did the coaster possess a negative height value?

$[6.8, 12.2]$

Functions - Properties - 02

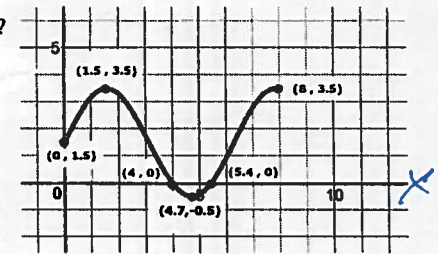
1. A drone rises into the air, maintains a certain height, then falls back to the ground and lands in a lake.



- a) What is the domain of the function?
What does it mean in concrete terms?
[0, 15] time the Drone rises and lands
- b) What is the range of the function?
What does it mean in concrete terms?
[3, 15] height the Drone goes from 4m to 15 meters
- c) What are the zeros of the function and what do they represent in concrete terms?
14, ground level at 14 SEC
- d) What is the initial value and what does it mean in concrete terms?
3, Drone Starts at height 3m
- e) Over what interval was the drone on an upward trajectory?
[0, 6]
- f) Over what interval was the drone on a downward trajectory?
[9, 15]
- g) Over what interval did the drone possess a positive height value?
[0, 14]
- h) Over what interval did the drone possess a negative height value?
[14, 15]

3

2. A roller coaster takes ride-goers above the park and under the ground.
The graph shows the height of the passengers as a function of time (min) since it started

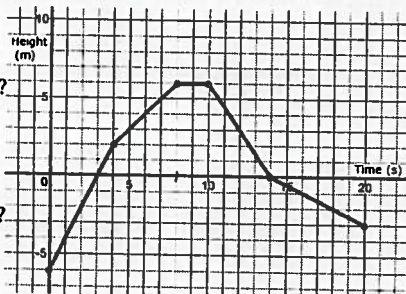


- a) What is the domain of the function?
[0, 8]
- b) What is the range of the function?
[-0.5, 3.5]
- c) What are the zeros of the function and what do they represent in concrete terms?
4, 5.4 it hit ground level at 4 and 5.4 min
- d) What is the initial value and what does it mean in concrete terms?
1.5m, the initial height of coaster
- e) Over what interval was the coaster on an upward trajectory? values
[0, 1.5] ∪ [4.7, 8]
- f) Over what interval was the coaster on a downward trajectory? values
[1.5, 4.7]
- g) Over what interval did the coaster possess a positive height value? values
[0, 4] ∪ [5.4, 8]
- h) Over what interval did the coaster possess a negative height value? value
[4, 5.4]

4

Functions - Properties - 03

1. A construction drill is turned on, raised into the air, then placed into the ground.



- a) What is the domain of the function?
What does it mean in concrete terms?

Time of operation $[0, 20]$

- b) What is the range of the function?
What does it mean in concrete terms?

$[-6, 6]$ Height during operation

- c) What are the zeros of the function and what do they represent in concrete terms?

3, 14 ground level

- d) What is the initial value and what does it mean in concrete terms?

-6, drill started 6m below ground

- e) Over what interval was the drill on an upward trajectory?

$[0, 10]$

- f) Over what interval was the drill on a downward trajectory?

$[10, 20]$

- g) Over what interval did the drill possess a positive height value?

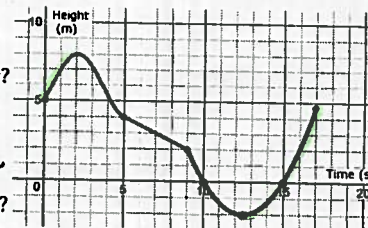
$[3, 14]$

- h) Over what interval did the drill possess a negative height value?

$[0, 3] \cup [14, 20]$

5

2. Mr. Stewart decides to build a skateboard ramp in his back yard. He uses part of his in-ground pool in the design of the ramp. The graph shows the elevation of the skateboard rider as a function of time (min) on the ramp



- a) What is the domain of the function?
What does it mean in concrete terms?

$[0, 17]$ Time to complete ride

- b) What is the range of the function?
What does it mean in concrete terms?

$[-2, 8]$

- c) What are the zeros of the function and what do they represent in concrete terms?

0, 10, 15 seconds, it takes 10 sec, 15 sec to reach ground level

- d) What is the initial value and what does it mean in concrete terms?

5m, the height of ramp.

- e) Over what interval was the coaster on an upward trajectory?

$[0, 3] \cup [12.5, 17]$

- f) Over what interval was the coaster on a downward trajectory?

$[3, 12.5]$

- g) Over what interval did the coaster possess a positive height value?

$[0, 10] \cup [15, 17]$

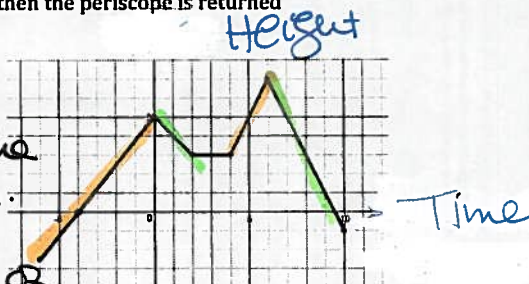
- h) Over what interval did the coaster possess a negative height value?

$[10, 15]$

6

Functions - Properties - 04

1. A submarine periscope is turned on under water and raised into the air. A torpedo is fired (at time 0 seconds), then the periscope is returned under water.



- a) What is the domain of the function?
What does it mean in concrete terms?

$[-6, 10]$ the time the periscope is on.

- b) What is the range of the function?
What does it mean in concrete terms?

$[-2.5, 7]$ the height of the periscope from 2m under to 7m over

- c) What are the zeros of the function and what do they represent?

$-4, 9.5$ sec, the time periscope was at surface of water

- d) What is the initial value of this function? What does it mean?

5 m, the height the torpedo is fired

- e) Over what interval was the periscope on an upward trajectory?

$[-6, 0] \cup [4, 6]$

- f) Over what interval was the periscope on a downward trajectory?

$[0, 2] \cup [6, 10]$

- g) Over what interval was the periscope height constant?

$[2, 4]$

- h) Over what interval did the periscope possess a positive height value?

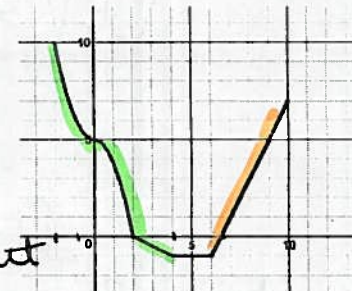
$[-4, 9.5]$

- i) Over what interval did the periscope possess a negative height value?

$[-6, -4] \cup [9.5, 10]$

7

2. Wesley builds a skateboard ramp in his back yard. He uses part of his in-ground pool in the design of the ramp. To ride on the ramp, Wesley jumps from the roof of his house. He makes contact with the ramp at time 0 seconds. The graph shows Wesley's elevation as a function of time (seconds) on the ramp



- a) What is the domain of the function?
What does it mean in concrete terms?

$[-2, 10]$ the time of the ride

- b) What is the range of the function?
What does it mean in concrete terms?

$[-1, 10]$ the height of the ride

- c) What are the zeros of the function?

2, 6.5 sec the time he's at ground level

- d) What is the initial value and what does it mean in concrete terms?

5m is height of roof from ground

- e) Over what interval is Wesley on an upward trajectory?

$[6, 10]$

- f) Over what interval is Wesley on a downward trajectory?

$[-2, 4]$

- g) Over what interval does Wesley possess a positive height value?

$[-2, 2] \cup [6.5, 10]$

- h) Over what interval does Wesley possess a negative height value?

$[2, 6.5]$

8

Functions - Properties - 05 - Practice Test

1. An underground oil drill is turned on and lowered into the sea. The drill is turned on when the time is at 0 seconds.

- a) What is the domain of the function?
How long is the drill being observed?

$[6, 23]$ the time

the oil drill is lowered and taken back out.

- b) What is the range of the function?
What elevation does it reach?

$[-15, 9]$ the height

of oil drill during operation.

- c) What are the zeros of the function and what do they represent?

$-2, 10$ sec the drill is at sea level.

- d) What is the initial value of this function? What does it mean?

-4 , the oil drill is turned on 4 m under water.

- e) Over what interval was the drill on an upward trajectory?

$[15, 23]$

- f) Over what interval was the drill on a downward trajectory?

$[-6, 10]$

- g) Over what interval was the drill height constant?

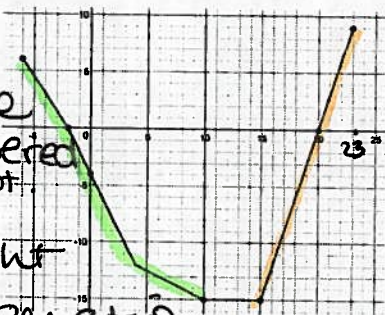
$[0, 15]$

- h) Over what interval did the drill possess a positive height value?

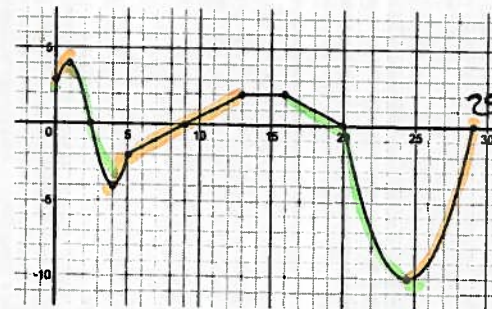
$[6, -2] \cup [20, 23]$

- i) Over what interval did the drill possess a negative height value?

$[-2, 20]$



2. An amusement park ride at Disney takes passengers above and below ground level. The graph shows the riders' elevation (m) as a function of time (seconds) on the ride.



- a) What is the domain of the function? How long does the ride last?

$[0, 29]$ time of ride

- b) What is the range of the function? What does it mean in real terms?

$[-10, 4]$ height of ride

- c) What are the zeros of the function?

$2.5, 9, 20, 29$ sec

- d) What is the initial value?

3 m

- e) Over what interval is the ride on an upward trajectory?

$[0, 1] \cup [4, 13] \cup [24.5, 29]$

- f) Over what interval is the ride on a downward trajectory?

$[1, 4] \cup [16, 24.5]$

- g) Over what interval does the ride possess a positive height value?

$[0, 2.5] \cup [9, 20]$

- h) Over what interval does the ride possess a negative height value?

$[2.5, 9] \cup [20, 29]$

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