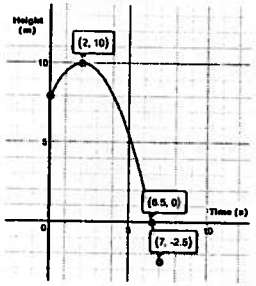
Functions – Properties – 01

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]

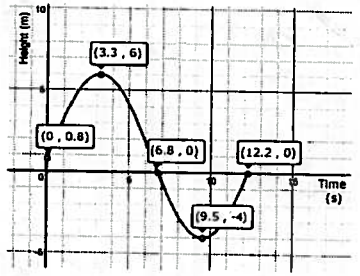
g) Over what interval did the rock possess a positive height value?

[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 Time Roller coaster is at ground level

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

0.8m, height of coaster

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

[0,3.3] ∪ [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?

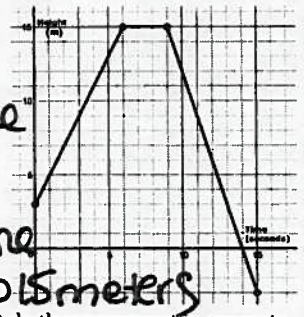
[0,6.8]

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 15meters

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 of 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]

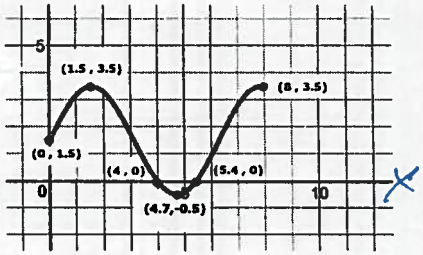
h) Over what interval did the drone possess a negative height value?

[14,15]

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

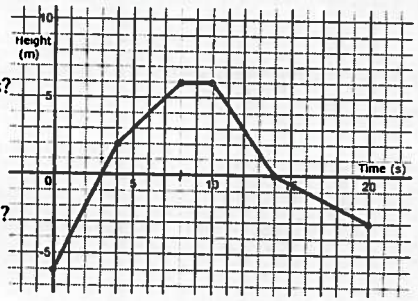
[0, 4] ∪ [5.4, 8]

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

[4, 5.4]

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, 8]

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

[(0,20)]

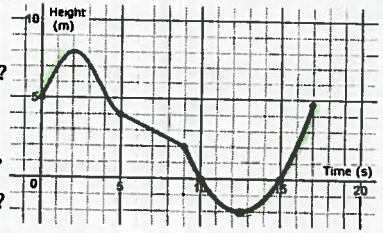
g) Over what interval did the drill possess a positive height value?

[3,14]

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

[0,3] ∪ [14,20]

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?

10, 15 seconds, it takes 10sec, 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] ∪ [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?

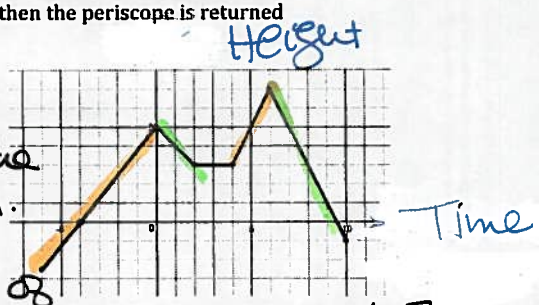
[0,10] ∪ [15,17]

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

[10,15]

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?

[-25,7] the height of the periscope from 2m under to 7 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] ∪ [4,6]

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

(0,2) ∪ [6,10]

g) Over what interval was the periscope height constant?

[2,4]

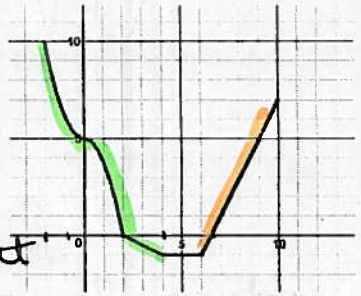
h) Over what interval did the periscope possess a positive height value?

[-4, 9.5]

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

[-6, -4) ∪ [9.5, 10]

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?

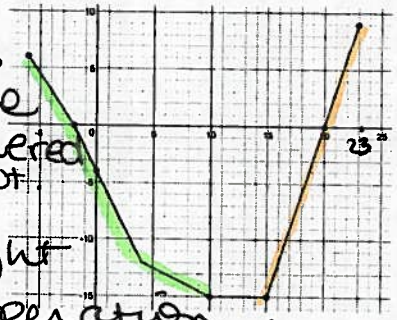
[-2,7] [6.5,10]

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

[2, 6.5]

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 4m underwater.

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?

[10, 15)

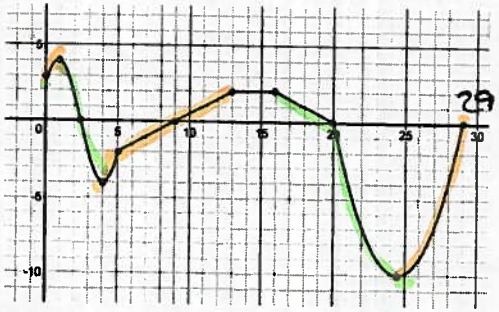
h) Over what interval did the drill possess a positive height value?

[-6, -2) ∪ [10, 23]

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

[-2, 10]

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?

3m

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

[0, 1] ∪ [4, 13] ∪ [24.5, 29]

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

[1, 4] ∪ [16, 24.5]

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

[0, 2.5) ∪ [9, 20]

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

[2.5, 9) ∪ [20, 29]