

M3L3.1

Graphing Relationships

Objective: We will be able to describe a relationship given a graph and sketch a graph given a description.

Vocabulary

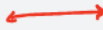


Continuous graph is a graph that is made up of connected lines or curves. Other types of graphs are not continuous.



Discrete graphs they are made up of distinct, unconnected points.



Possible line descriptions

Horizontal 	Slanting upward 	Slanting downward 
stays the same does not change remains constant does not move	increases goes up climbs	decreases goes down descends

1 Explore The distance a delivery van is from the warehouse varies throughout the day. The graph shows the distance from the warehouse for a day from 8:00 am to 5:00 pm.

A Segment 1 shows that the delivery van moved away from the warehouse. What does segment 2 show?

Segment 2 shows that the truck moved away from the warehouse at a slower speed than segment 1.

B Based on the time frame, what change in the distance from the warehouse is represented by segment 6?

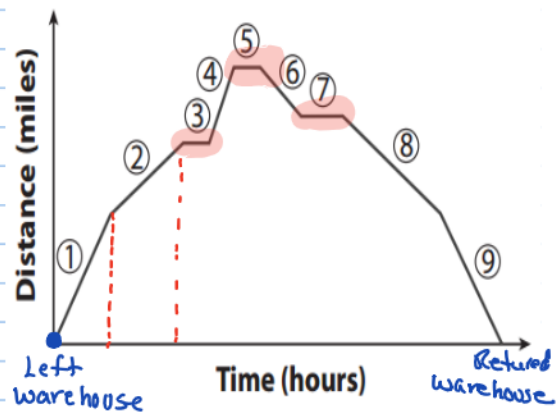
The segment shows that the truck begins to return to the warehouse.

C Which line segments show intervals where the distance did not change?

Segments 3, 5, and 7.

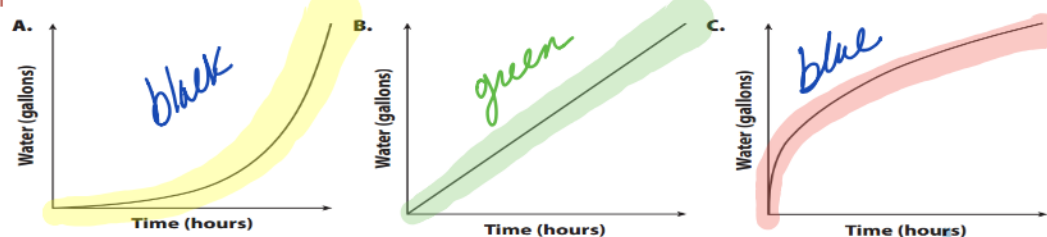
D What is a possible explanation for these segments?

The truck was not moving, so it could have been delivering packages



2 Example

Three hoses fill three different water barrels. A green hose fills a water barrel at a constant rate. A black hose is slowly opened when filling the barrel. A blue hose is completely open at the beginning and then slowly closed. The three graphs of the situations are shown.



A Which graph best represents the amount of water in the barrel filled by the green hose? Since the flow of the water is constant, the amount of water in the barrel should be a steady increase. Thus, graph B best represents the situation.

B Describe the water level represented by each graph. Then determine which graph represents each situation.

Describe the water level for graph A.

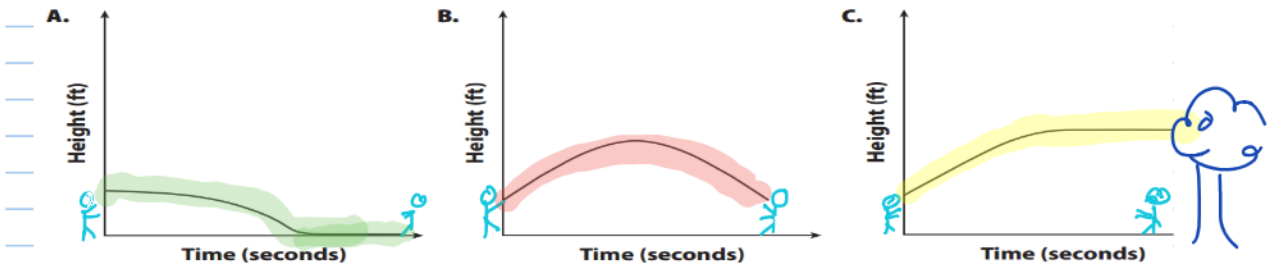
The water level for graph A begins slowly and then increases rapidly over time.

Describe the water level for graph C

The water level for graph C increases rapidly and then slows down over time

3 Example

You and a friend are playing catch. You throw three different balls to your friend. You throw the first ball in an arc and your friend catches it. You throw the second ball in an arc, but this time the ball gets stuck in a tree. You throw the third ball directly at your friend, but it lands in front of your friend, and rolls the rest of the way on the ground. The three graphs of these situations are shown.



A Which graph represents the situation where the ball gets stuck in the tree?
 Graph C. The ball should increase in height and then stay at a certain height.

B Describe the height of the ball represented by the other two graphs.
 Graph A shows the ball thrown from a certain height with the height decreasing until the ball hits the ground and then rolls. Graph B shows the ball thrown from a certain height with the height increasing then decreasing in an arc until the ball is caught at a certain height.

4 Example

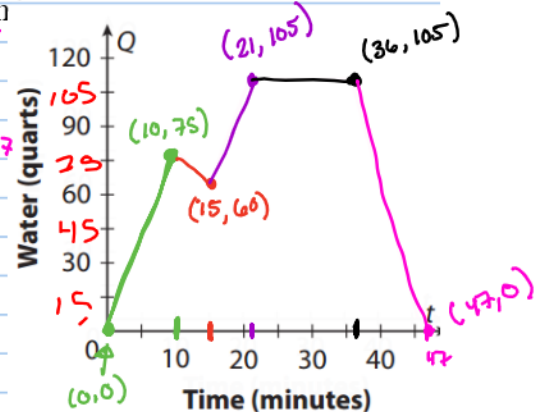
Sketch a graph of the situation, tell whether the graph is continuous or discrete, and determine the domain and range.

A bathtub is being filled with water. After 10 minutes, there are 75 quarts of water in the tub. Then someone accidentally pulls the drain plug while the water is still running, and the tub begins to empty. The tub loses 15 quarts in 5 minutes, and then someone plugs the drain and the tub fills for 6 more minutes, gaining another 45 quarts of water. After a 15-minute bath, the person gets out and pulls the drain plug. It takes 11 minutes for the tub to drain.

The graph is a continuous graph.

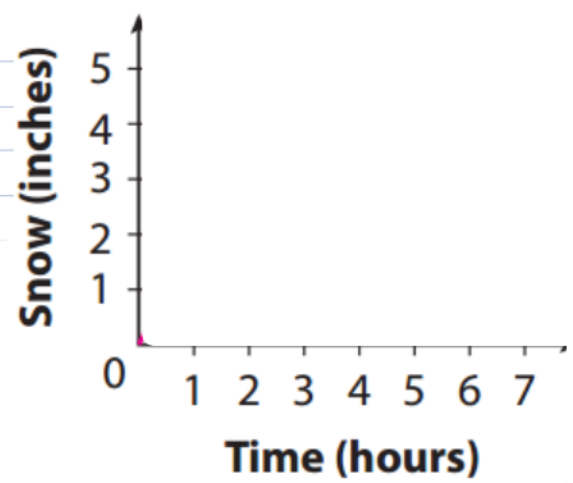
The domain is $0 \leq t \leq 47 \rightarrow t \geq 0 \ \& \ t \leq 47$

The range is $0 \leq Q \leq 105 \rightarrow Q \geq 0 \ \& \ Q \leq 105$



5 Example Sketch a graph of the situation, tell whether the graph is continuous or discrete, and determine the domain and range.

At the start of a snowstorm, it snowed two inches an hour for two hours, then slowed to one inch an hour for an additional hour before stopping. Three hours after the snow stopped, it began to melt at one-half an inch an hour for two hours.



6 Example Sketch a graph of the situation, tell whether the graph is continuous or discrete, and determine the domain and range.

A local salesman is going door to door trying to sell vacuums. For every vacuum he sells, he makes \$20. He can sell a maximum of 10 vacuums a day.

The graph is a discrete graph.
The domain is whole numbers from 0 to 10.
The range is whole number multiples of 20 from 0 to 200.

