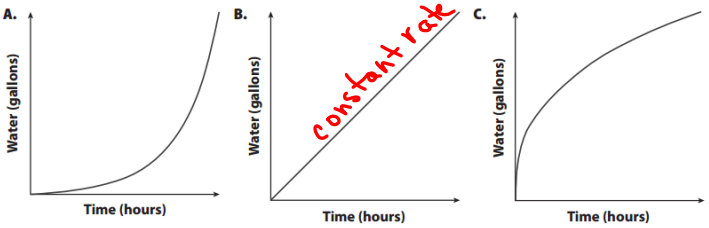
Explain 1 Relating Graphs to Situations

Graphs can often be drawn to represent real life situations. These graphs are not always easily derived from equations, but rather represent certain situations. For example, these graphs may include the amount of rain over a certain period of time, or the height of a bouncing ball over a certain period of time.

Example 1 **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?

B

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

Describe the water level for graph A.

starts slow then increases rapidly

Describe the water level for graph C.

starts fast then slows down

Graph A represents the black hose and graph C represents the blue hose.

Reflect

2. Could a graph of the amount of water in a water barrel slant downward from left to right? Explain.

yes, emptying the barrel

Continuous graph - made up of connected lines or curves

Discrete graph - made up of distinct (different) unconnected points.

Domain - the x-values

Range - the y-values

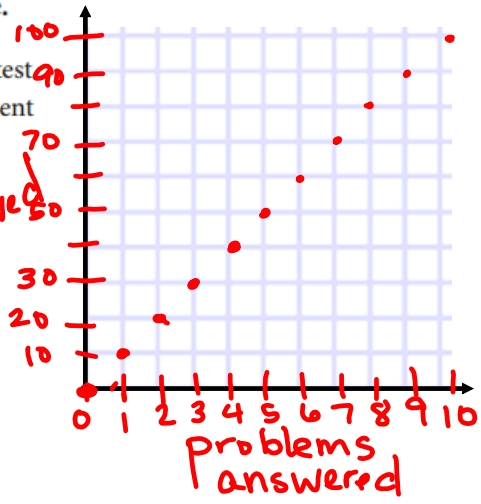
Example 2 **Sketch a graph of the situation, tell whether the graph is continuous or discrete, and determine the domain and range.**

(A) A student is taking a test. There are 10 problems on the test. For each problem the student answers correctly, the student received 10 points.

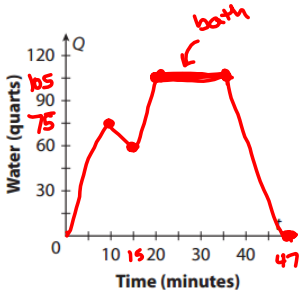
The graph is a discrete graph.

The domain is 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10

The range is whole # multiples of 10 from 0 to 100



(B) 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.

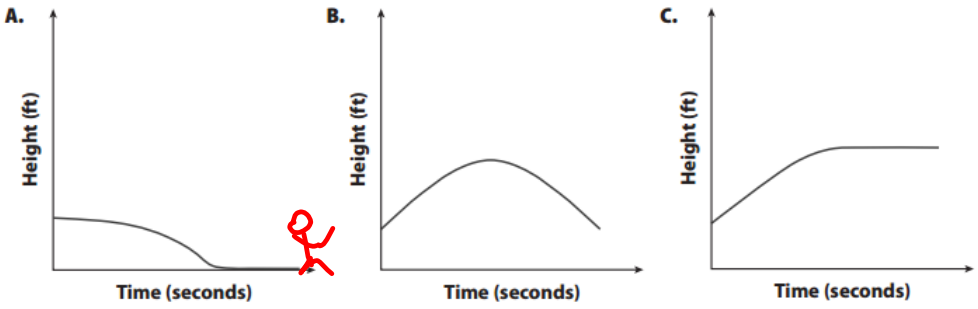


The graph is a Continuous graph.

The domain is $0 \leq t \leq 47$

The range is $0 \leq Q \leq 105$

Try this: **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.**



3. Which graph represents the situation where the ball gets stuck in the tree?

C

4. Describe the height of the ball represented by the other two graphs.

A) steady rate then drops to ground & rolls

B) Ball thrown up at an arc & it falls back down to the person who catches it.

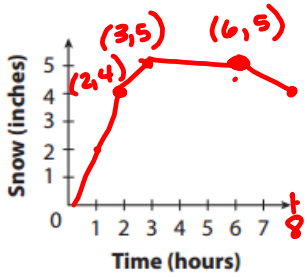
Try this:

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

5. 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.

Continuous

D: $0 \le t \le 8$ R: $0 \le s \le 5$

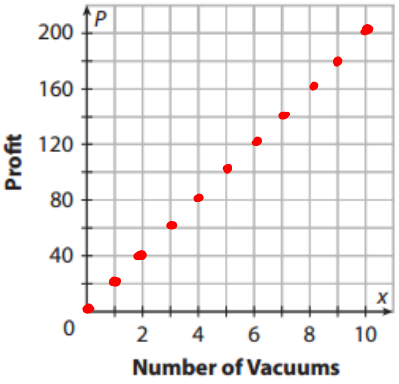


6. A local salesman is going door to door trying to sell vacuums. For every vacuum he sells, he makes $20. He can sell a maximum of 10 vacuums a day.

Discrete

D: whole #'s from 0 to 10

R: whole # multiples of 20 from 0 to 200



Homework

pg 91; 1-22