4-1 Using Graphs to Relate Two Quantities

SOLVE IT!

Getting Ready!

The graphs below relate the height of the water to the volume of the water in each container.
Which graph goes with which container? Justify your reasoning.

As you may have noticed in the Solve It, the change in the height of the water as the volume increases is related to the shape of the container. You can use graphs to visually represent the relationship between two variable quantities as they both change.

PROBLEM 1: ANALYZING A GRAPH

a) The graph shows the volume of air in a balloon as you blow it up. What are the variables? Describe how the variables are related at various points on the graph.

Air in Balloon
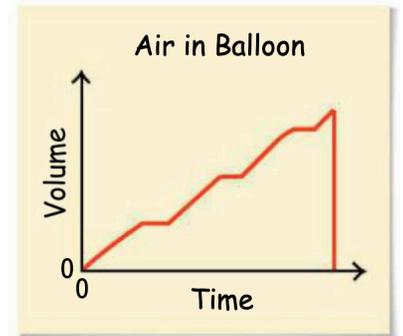
What are the variables in each graph? Describe how the variables are related at various points on the graph.

b)

c)

d)
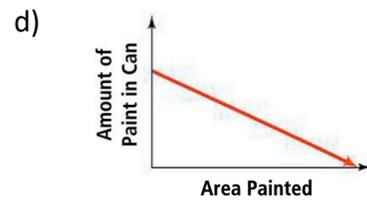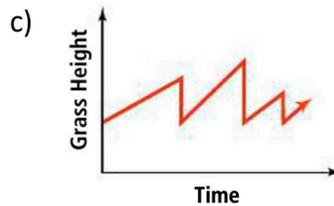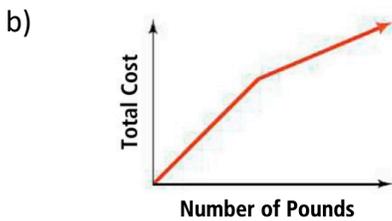
Tables and graphs can both show relationships between variables. Data from a table are often displayed using a graph to visually represent the relationship.

## PROBLEM 2: MATCHING A TABLE AND A GRAPH

a)

Multiple Choice A band allowed fans to download its new video from its Web site. The table shows the total number of downloads after 1, 2, 3, and 4 days. Which graph could represent the data shown in the table?

Video Downloads

Day	Total Downloads
1	346
2	1011
3	3455
4	10,426

(A)
Total Downloads / Day

(C)
Total Downloads / Day

(B)
Total Downloads / Day

(D)
Total Downloads / Day
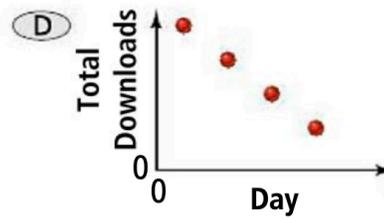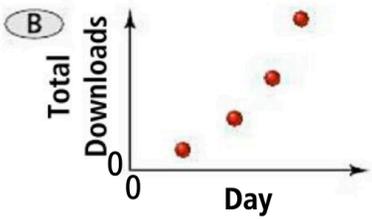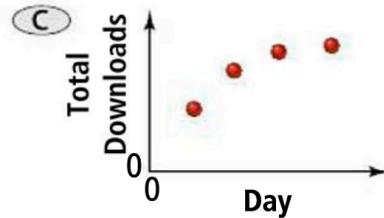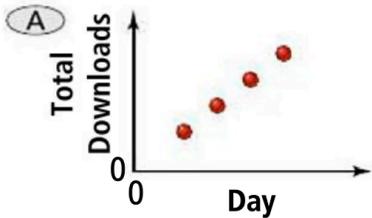
Match each graph with its related table. Explain your answers.

b)
Temp (°F) / Time

c)
Temp (°F) / Time

d)
Temp (°F) / Time

i)
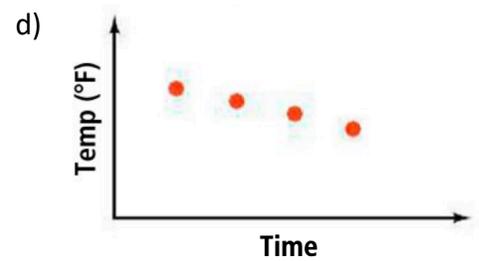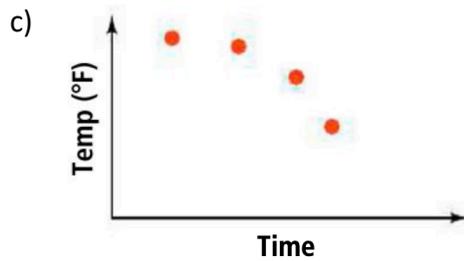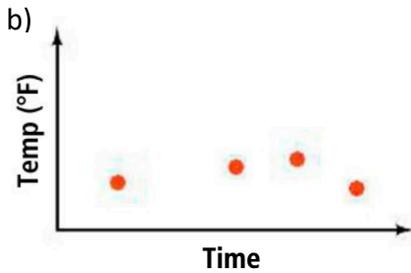
Time	Temperature (°F)
1 P.M.	91°
3 P.M.	89°
5 P.M.	81°
7 P.M.	64°

ii)

Time	Temperature (°F)
1 P.M.	61°
3 P.M.	60°
5 P.M.	59°
7 P.M.	58°

iii)

Time	Temperature (°F)
1 P.M.	24°
3 P.M.	26°
5 P.M.	27°
7 P.M.	21°

In Problem 2, the number of downloads, which is on the vertical axis of each graph, depends on the day, which is on the horizontal axis. When one quantity depends on another, show the independent quantity on the horizontal axis and the dependent quantity on the vertical axis.

PROBLEM 3: SKETCHING A GRAPH

a) A model rocket rises quickly and then slows to a stop as its fuel burns out. It begins to fall quickly until the parachute opens, after which it falls slowly back to Earth. Sketch a graph that could represent the height of the rocket during it flight. Label each section.

b) Suppose you start to swing yourself on a playground swing. You move back and forth and swing higher in the air. Then you slowly swing to a stop. Sketch a graph that could represent how your height from the ground might change over time. Label each section.

c) Sketch a graph to represent your pulse rate os you watch a scary movie. Label each section

d) Sketch a graph to represent the relationship between the distance and time for each of the following situations.

i) A car travels at a steady speed

ii) A cyclist slows down as she rides up a hill and speeds up as she peddles over the top.

iii) A train slows down as it arrives at the station

iv) A plane accelerates steadily down the runway until it takes off

e) Sketch a graph to represent the relationship between the speed and time for the same situations.

i) A car travels at a steady speed

ii) A cyclist slows down as she rides up a hill and speeds up as she peddles over the top.

iii) A train slows down as it arrives at the station

iv) A plane accelerates steadily down the runway until it takes off