# The Ant and the Sugar

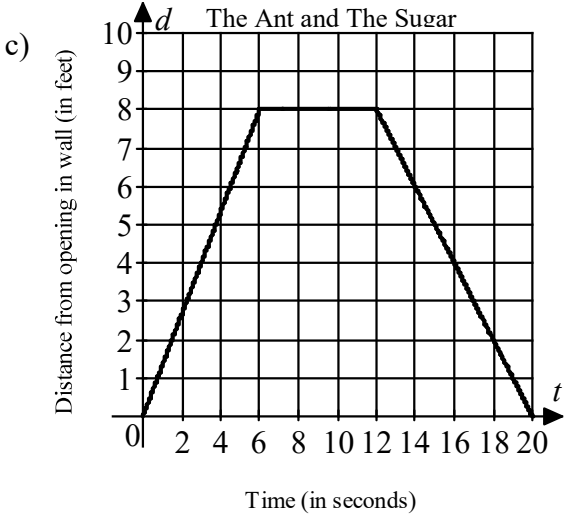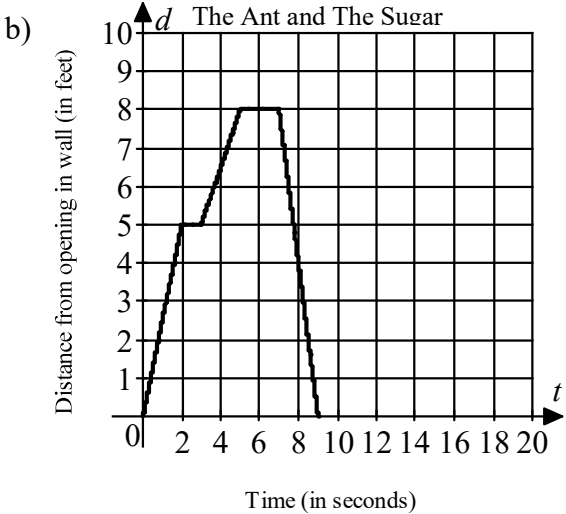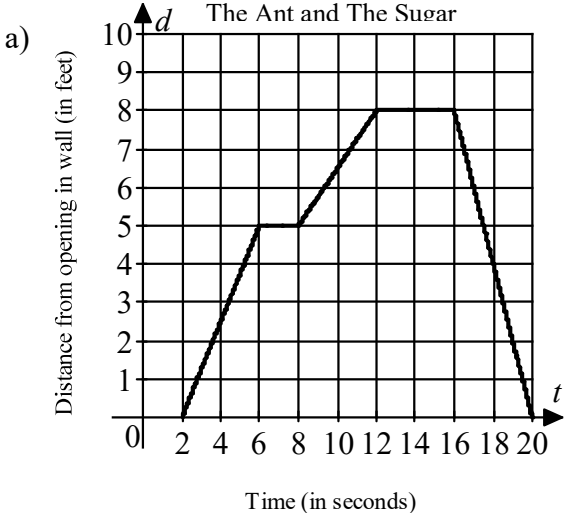1.   Act out the story given below.

Set the scene: A "scout ant" discovers that sugar has been spilled on Karen's kitchen countertop. The ant marks a straight line trail from the sugar back to the hole in the wall where ants can crawl directly onto the countertop. The sugar is 8 feet from the hole in the wall.

Begin the action: At time $t = 0$ seconds, a "worker ant" crawls onto the countertop from the wall entrance. The ant follows the trail for four seconds and travels 5 feet. The ant then stops for two seconds to check for danger. It continues on the path and arrives at the sugar four seconds later. It collects sugar for four seconds then crawls directly back to the wall entrance. The worker ant is on the kitchen counter for 18 seconds.

2.   Discuss how the graph describes the story.
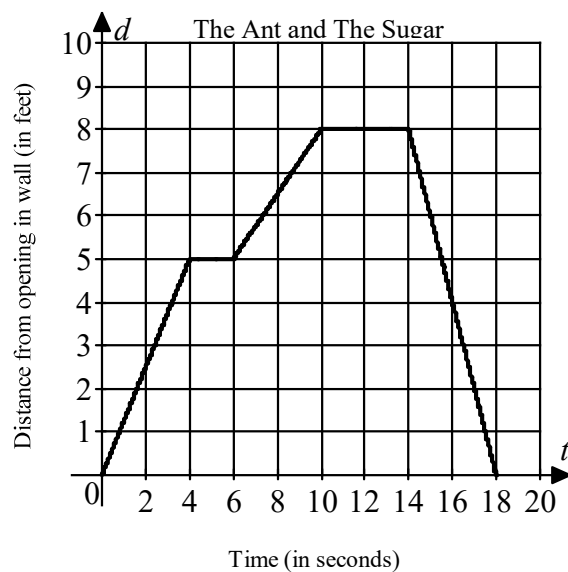
3. The following graphs illustrate modifications of the story for other "worker ants". Act out each graph and then list the changes that have been made in the story.

a)

The Ant and The Sugar

Distance from opening in wall (in feet)

Time (in seconds)

b)

The Ant and The Sugar

Distance from opening in wall (in feet)

Time (in seconds)

c)

The Ant and The Sugar

Distance from opening in wall (in feet)

Time (in seconds)

4. The following stories are modifications of the original story. Draw a graph to illustrate each story. The scene is the same as in the original story.

a) A second ant slips through the wall onto the kitchen counter at time $t = 2$ seconds and then for 8 seconds follows the trail directly to the sugar. It collects sugar for 3 seconds and crawls directly back to the wall entrance. The return from the sugar to the wall takes 5 seconds.

The Ant and The Sugar

Distance from opening in wall (in feet) / Time (in seconds)
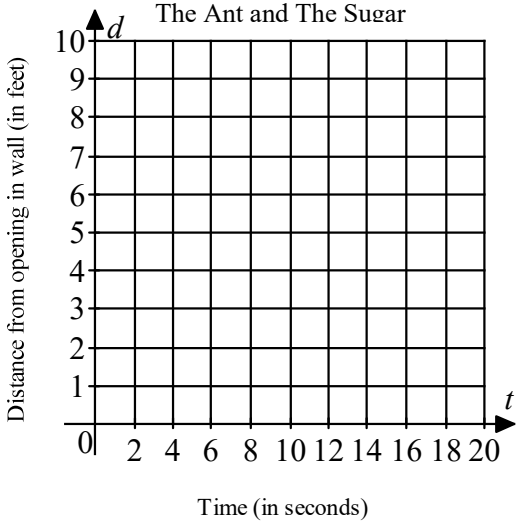
b) A third ant slips through the wall at $t = 4$ seconds and arrives at the sugar 6 seconds later. It collects sugar for only 2 seconds before it is frightened and crawls back to the wall in 5 seconds.

The Ant and The Sugar

Distance from opening in wall (in feet) / Time (in seconds)
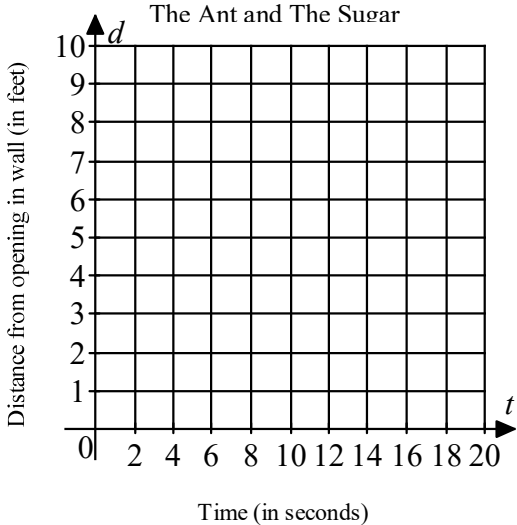
5.   Of the graphs drawn in questions 3a, 3b, or 3c, which graphs show that
    a)   the ant collected sugar for 4 seconds?
    b)   the ant returned to the wall in half the time required by the ant in question 2?
    c)   the ant crawled part of the way toward the sugar at 2.5 feet per second?
    d)   the ant stood still for a total of 6 seconds?
    e)   the ant crawled at the slowest non-zero rate?
    f)   the ant crawled at the fastest rate?
    g)   the ant collected sugar for the shortest amount of time?
    h)   the distance traveled by the ant was 16 feet?

6.   Write a story that is represented by the following graph. The motion must be along a straight path. Change the *d*-axis label to read "Distance in miles from …" to match the story and title the graph.

Title: _____

Time (in minutes)
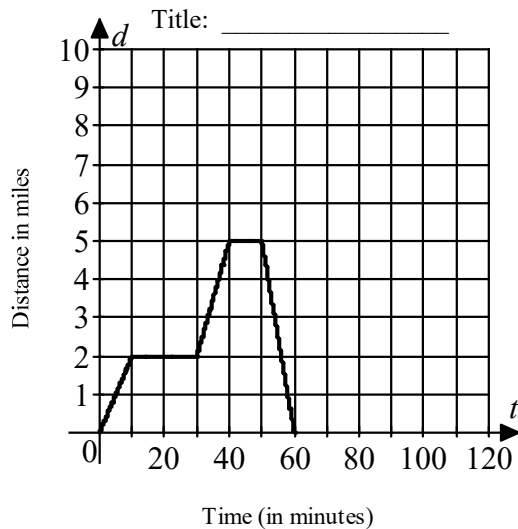
7.   For each of the graphs provided, write a story to modify the one written in question 6. Change the *d*-axis label to read "Distance in miles from …" to match the story and title the graph.

Title: _____   b)   Title: _____

Time (in minutes)   Time (in minutes)