LESSON 16

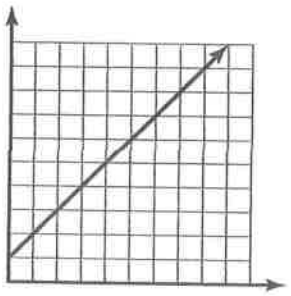
Name _____

8.F.5 #68

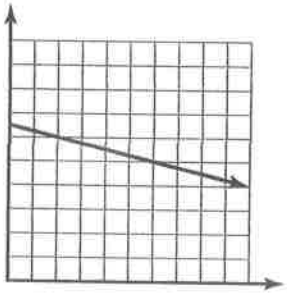
Describing Functional Relationships from Graphs

1 GETTING THE IDEA

The graph of a **linear function** is a line. If the line rises from left to right, the function is said to be an increasing function. If it falls from left to right, the function is said to be a decreasing function.

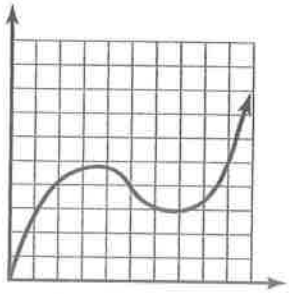


Increasing Linear Function

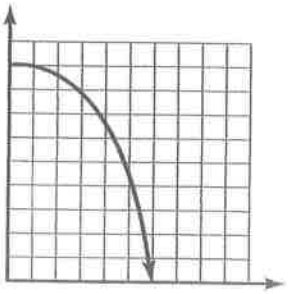


Decreasing Linear Function

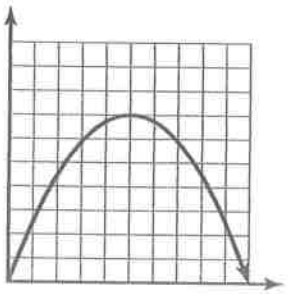
The graphs of **nonlinear functions** may be increasing, decreasing, or a combination of increasing and decreasing.



Increasing Nonlinear Function



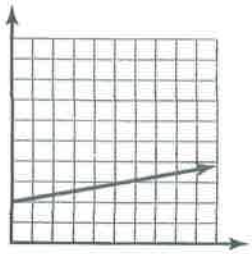
Decreasing Nonlinear Function



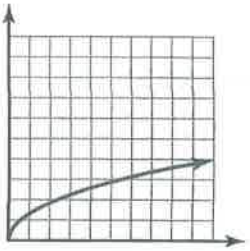
Nonlinear Function that Increases and then Decreases

3 LESSON PRACTICE

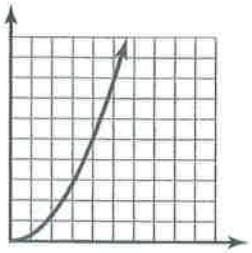
1. Select a graph that represents an increasing nonlinear function. Circle all that apply.



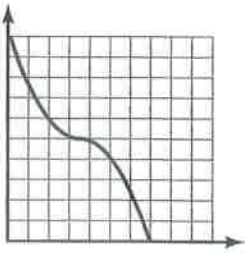
A.



C.

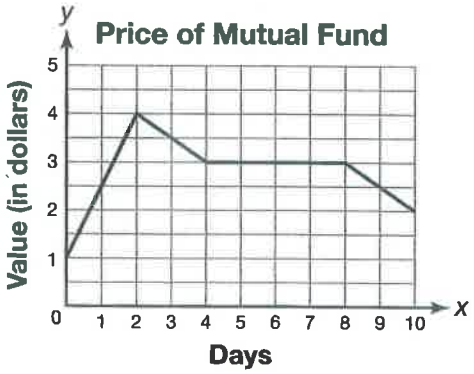


B.



D.

2. The graph shows the price of a mutual fund over a period of 10 days.



Part A

Use words from the box to complete each sentence.

Between $x = 0$ and $x = 2$, the function is _____.

Between $x = 2$ and $x = 4$, the function is _____.

Between $x = 4$ and $x = 8$, the function is _____.

Between $x = 8$ and $x = 10$, the function is _____.

increasing
decreasing
constant

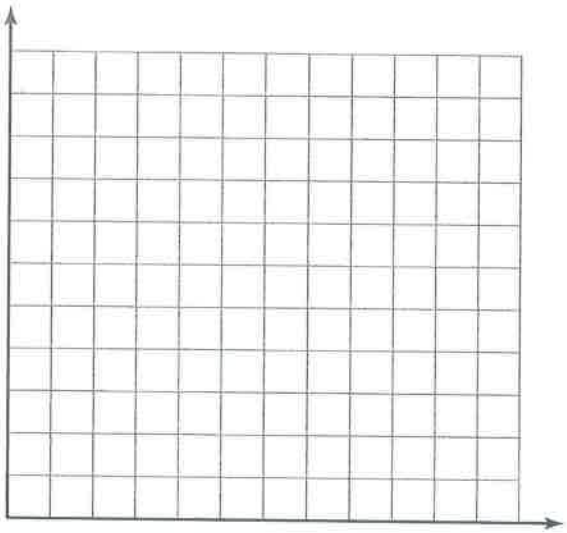
Part B

Is the function represented by the graph linear or nonlinear? Explain your reasoning.

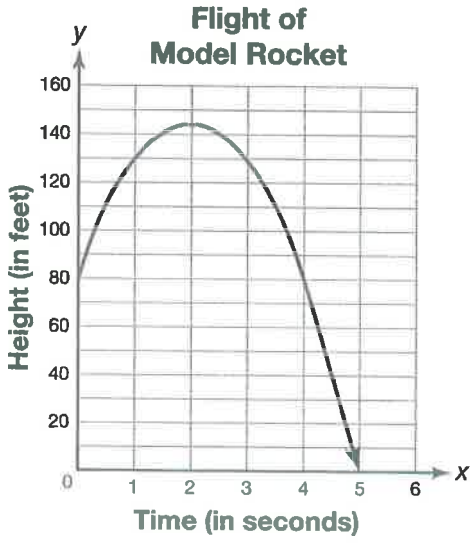
_____

3 A hot air balloon rises steadily for 15 minutes until it is 2,000 feet above the ground. It then flies at this altitude for 30 minutes. Over the next 15 minutes, the balloon drops 500 feet. It flies at this new altitude for 30 minutes. Then the balloon takes 30 minutes to return to the ground.

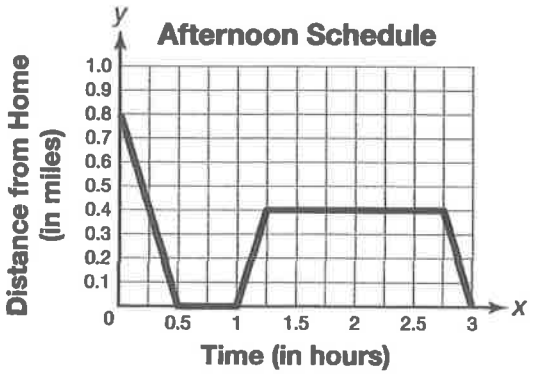
Draw a graph of the function that represents the situation.



4 The height of a model rocket launched into the air can be modeled by a nonlinear function. A graph of the function is shown below. Interpret the graph in terms of the situation it models. Use the words *increasing* and *decreasing* in your description, as well as specific values from the graph.



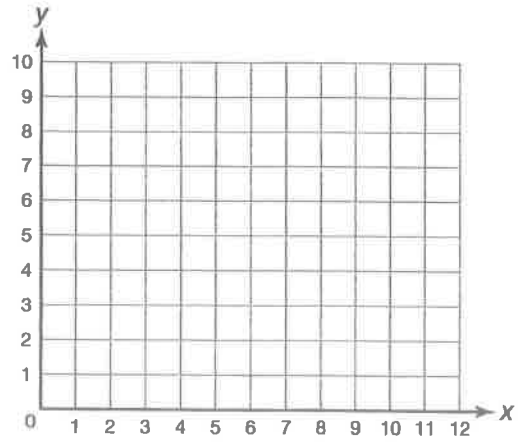
5 Tyrone created a graph to show how he spent the 3 hours between the time he left school and the time he had dinner. Complete the description of the sequence of events represented by the graph.



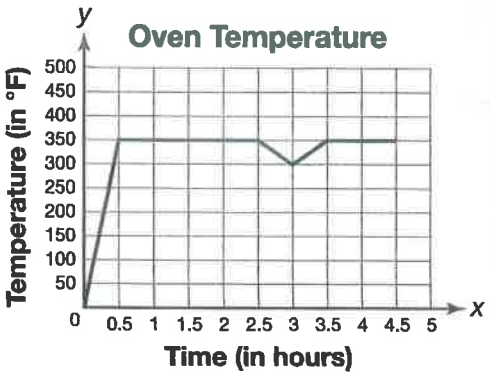
Tyrone left school and walked _____ mile home. He remained at home for _____ minutes. He then walked _____ mile to his friend Ben's house. He and Ben worked on their project for _____ hours, at which time Tyrone left and walked home. The walk home took _____ minutes.

6 Graph a function that has the following characteristics on the grid below:

- It is decreasing for all values of x between 0 and 4.
- It is constant for all values of x between 4 and 7.
- It is increasing for all values of x greater than 7.
- Its graph contains the points (3, 5) and (5, 3).
- A piece of the graph is a curve.



7 Katherine is roasting a large ham in her oven. Partway through the cooking process, she pulls the ham out of the oven to add a glaze. The graph shows the temperature of the oven during the roasting process.



Part A

Circle the part of the graph that represents where the function is decreasing.

Part B

Interpret the meaning of the piece of the graph you circled in Part A.

8 Mrs. Kim plans to run three errands this morning. She leaves the house at 9:00 a.m., drives 4 miles to the post office, drives 5 miles farther to the drugstore, and returns home, stopping at the library along the way, which is only 1 mile from her house. She spends 10 minutes at each stop, and she is home by 10:00 a.m.

Draw the graph of a function that could represent the situation.