

Chapter 1: FUNCTION SENSE**Activity 1.4 & 5****Learning Objectives**

1. Use a function as a mathematical model.
2. Determine when a function is increasing, decreasing, or constant.
3. Use the vertical line test to determine if a graph represents a function.
4. Describe in words what a graph tells you about a given situation.
5. Sketch a graph that best represents the situation described in words.
6. Identify increasing, decreasing, and constant parts of a graph.
7. Identify minimum and maximum points on a graph.

Key Terms – Use the vocabulary terms listed below to complete each statement.

constant decreasing increasing mathematical model maximum minimum

1. A function is _____ if its graph goes up to the right.
2. A(n) _____ is an equation or a graph that fits or approximates the actual data.
3. A function is _____ if its graph is horizontal.
4. A function is _____ if its graph goes down to the right.
5. If a function decreases and then increases, the point where the graph changes from falling to rising is called a _____ point.
6. If a function increases and then decreases, the point where the graph changes from rising to falling is called a _____ point.

Practice Exercises

1. Use the following scenario to answer questions a-h:

The value of a lake front vacation home appreciates over time. You purchase a small home for \$85,000 and the value increases by \$1250 per year.

- a. State a question you might want to answer in this situation.
- b. What two variables are involved in this problem?
- c. Which variable can best be designated as the dependent variable?
- d. Which variable can best be designated as the independent variable?
- e. Complete the following table:

Independent Variable	1	2	3
Dependent Variable			
- f. State in words the relationship between the independent and dependent variables.
- g. Translate the written statement from **f** as an equation. Use appropriate letters to represent the variables involved.
- h. If you plan to keep the home for 8 years, determine the value of the home at the end of this period.

2. For a-c below, use the following function: $f(x) = 4x - 6$.

a. Use your graphing calculator to graph the function. Make a sketch below.

b. Determine if the function is increasing or decreasing or constant.

c. Explain your answer to b.

3. For a-c below, use the following function: $g(x) = -3$.

a. Use your graphing calculator to graph the function. Make a sketch below.

d. Determine if the function is increasing or decreasing or constant.

b. Explain your answer to b.

4. For a-c below, use the following function: $f(x) = 4 - 3x$.

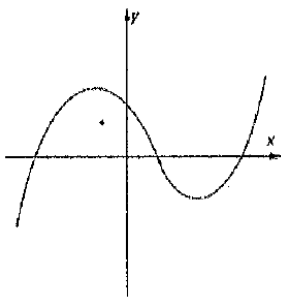
c. Use your graphing calculator to graph the function. Make a sketch below.

e. Determine if the function is increasing or decreasing or constant.

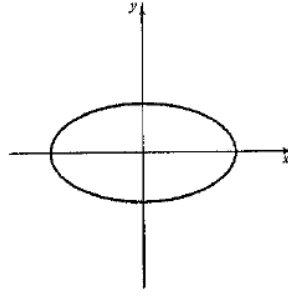
d. Explain your answer to b.

5. For a-f, use the vertical line test to determine whether each graph represents a function.

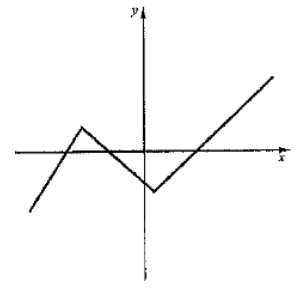
a.



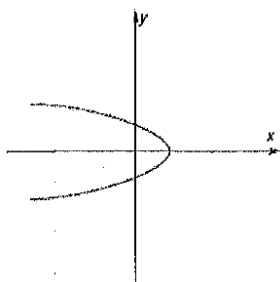
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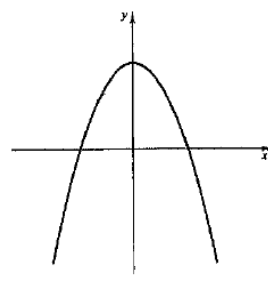
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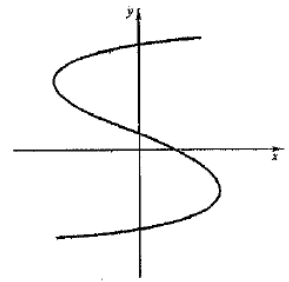
b.



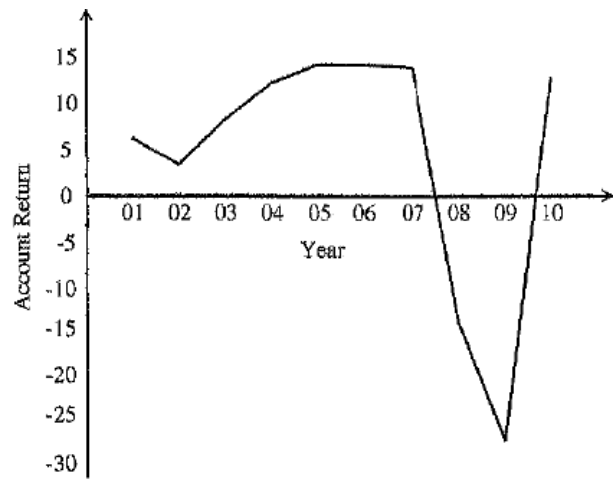
d.



f.



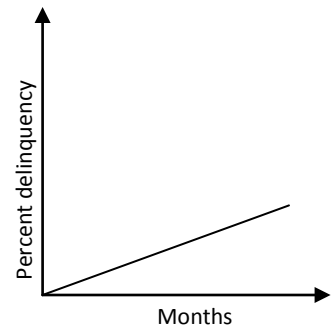
6. For a-j, use the following graph that shows an account's return over a 10-year period.



- a. Identify the independent variable
- b. Identify the dependent variable
- c. Interpret the situation being represented in the period from 2001 to 2002.
- d. Interpret the situation being represented in the period from 2002 to 2005.
- e. Interpret the situation being represented in the period from 2005 to 2007.
- f. Interpret the situation being represented in the period from 2007 to 2009.
- g. Interpret the situation being represented in the period from 2009 to 2010.

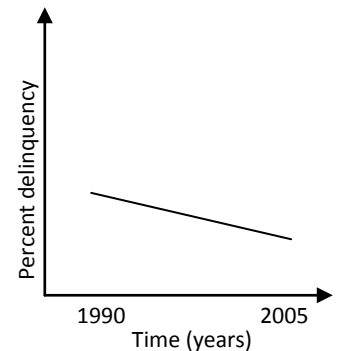
- h. Interpret the situation being represented in the year 2005
- i. Interpret the situation being represented in the year 2009.
- j. Interpret the situation being represented in the period from 2009 to 2010.

7. For a-d, use the following graph at the right, which shows the US car-loan delinquency rate (as a percent) for a time period (in number of months) after origination.



- a. Identify the independent variable.
- b. Interpret the situation being represented.
- c. Identify the dependent variable.
- d. Relate your interpretation to the graph.

8. For a-d, use the following graph at the right, which shows the percent of the population living on less than \$1.25/day from a United Nations report on developing countries.



- a. Identify the independent variable.
- b. Interpret the situation being represented.
- c. Identify the dependent variable.
- d. Relate your interpretation to the graph.

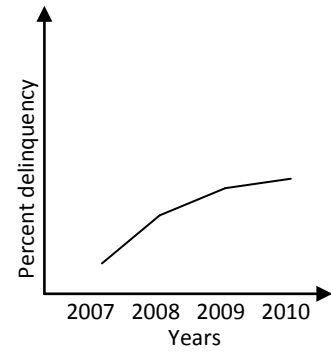
9. For a-d, use the following graph at the right, which shows China's internet use over a 4-year period.

a. Identify the independent variable.

c. Identify the dependent variable.

b. Interpret the situation being represented.

d. Relate your interpretation to the graph.



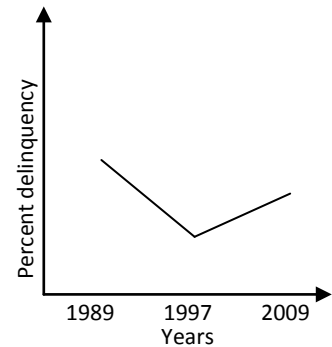
10. For a-d, use the following graph at the right, which shows Great Britain's spending on Defense.

a. Identify the independent variable.

c. Identify the dependent variable.

b. Interpret the situation being represented.

d. Relate your interpretation to the graph.



Concept Connections

1. What is the purpose of a mathematical model?

2. Explain the vertical line test and its purpose.

3. The graph in #10, has a minimum at year 1997. Explain why this is a minimum.

4. In what year does the graph in #9 show a maximum? Explain why this is a maximum.