



Discrete v. Continuous

Name

*Kay*

Date

**Situation Cards**

*(Match each card w/ a graph)*

*\*Graphs are left over\**

**A** ✓  
A coach collects data on each player (age) and his height.

**B** ✓  
A gardener records the age of a tree and its height.

**C** ✓  
Tickets to a concert cost \$20 each

**D** ✓  
The temperature inside a car over time

**E** ✓  
The market sells strawberries for \$5 per pound

**F** ✓  
The speed of a roller coaster at Disney World at various times.

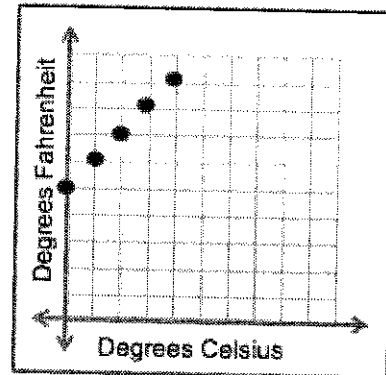
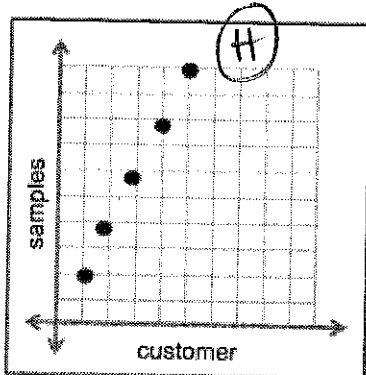
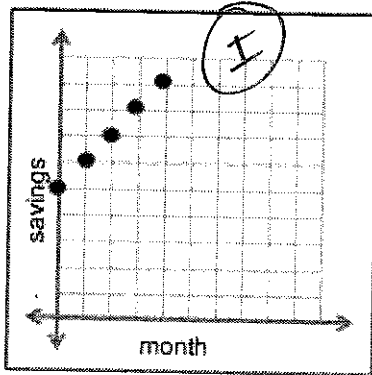
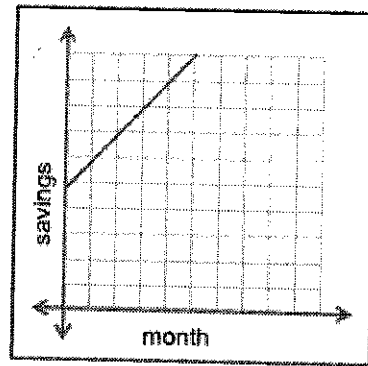
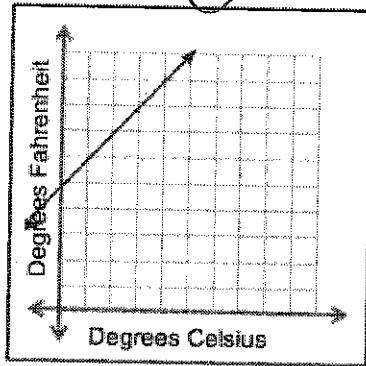
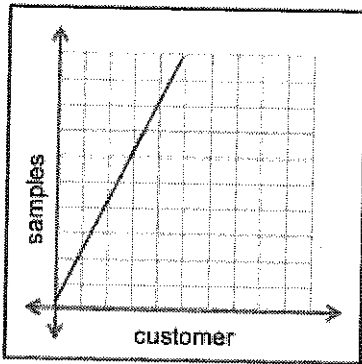
**G** ✓  
The volume of the water in a swimming pool steadily decreases by 15 gallons per minute

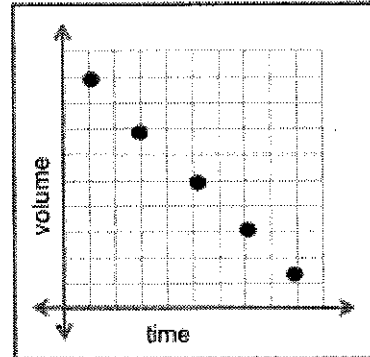
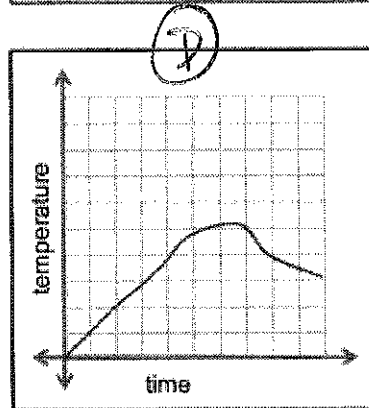
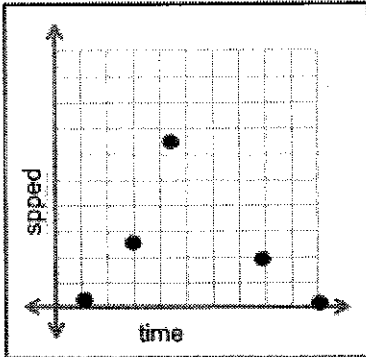
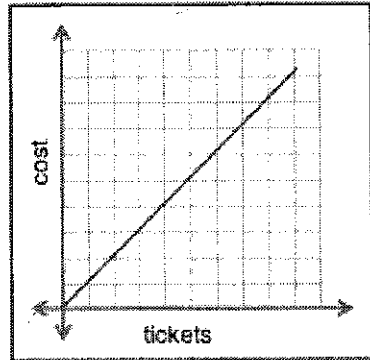
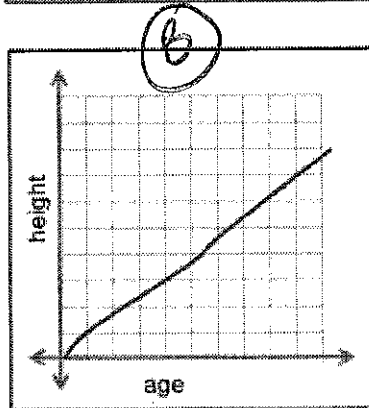
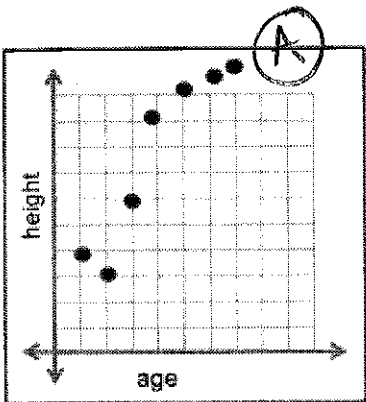
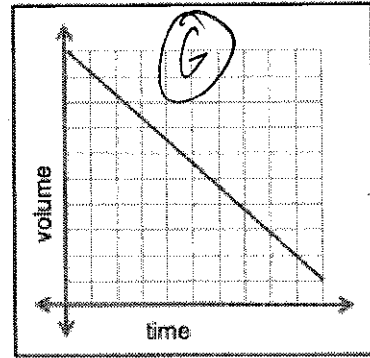
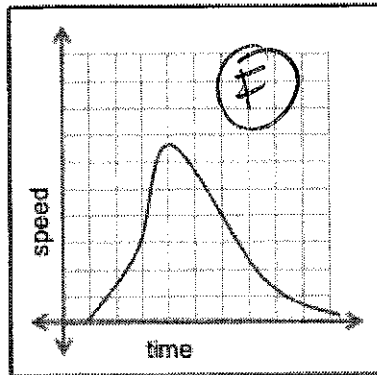
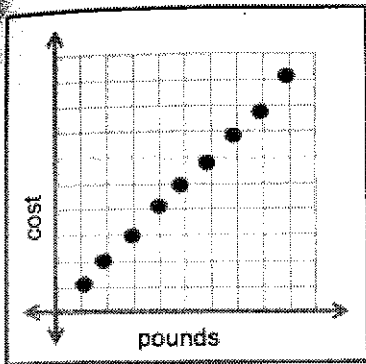
**H** ✓  
Each customer who enters the grocery store gets 2 free samples of chocolate.

**I** ✓  
Phillip is saving money for a dirtbike. He has \$50 and saves \$10 per month.

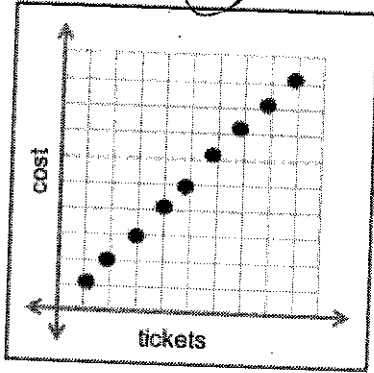
J. ✓  
 The formula  $F=1.8C + 32$  compares the temperatures in degrees Celsius, C, to temperatures in degrees Fahrenheit, F.

Graph Cards

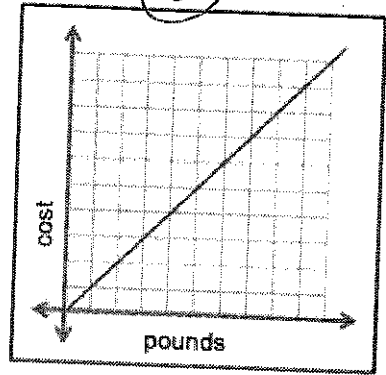
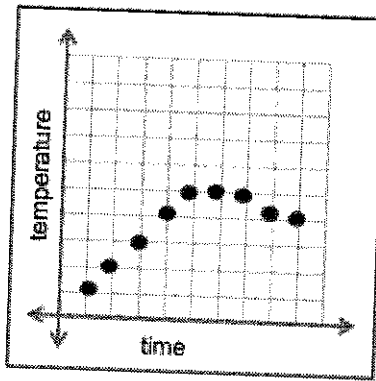




C



E



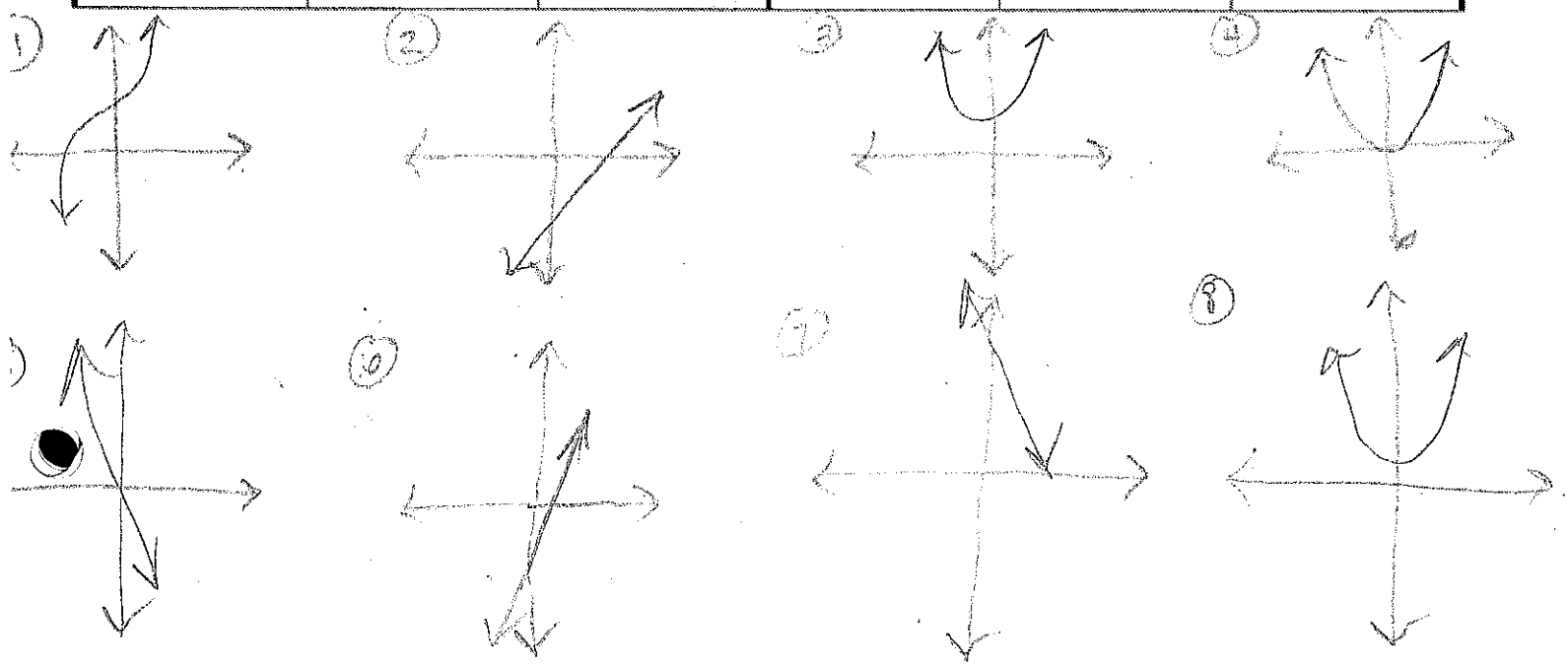
# Key

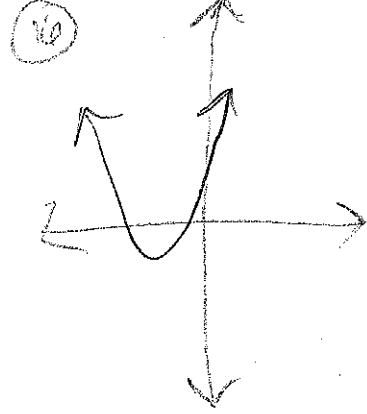
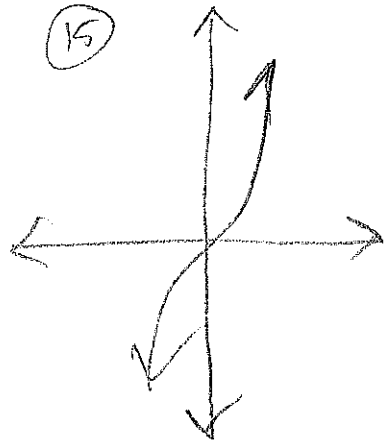
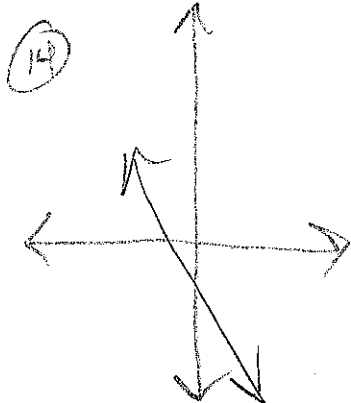
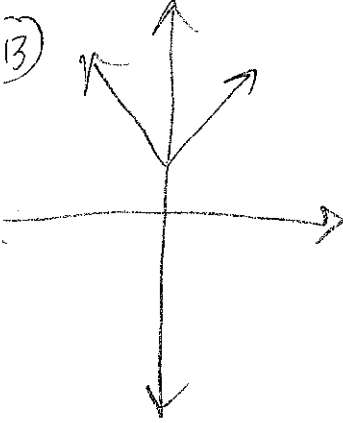
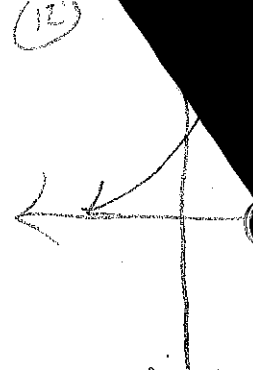
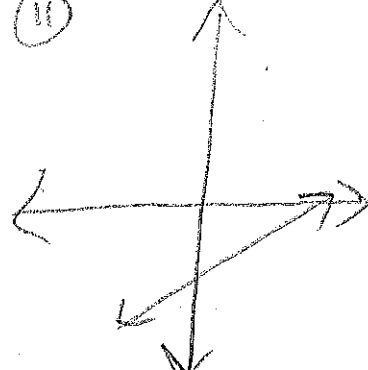
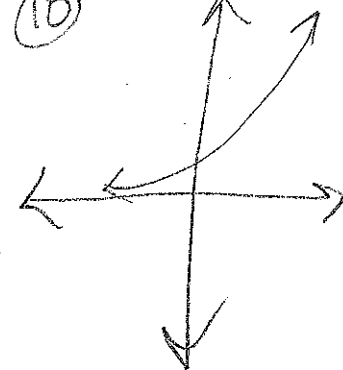
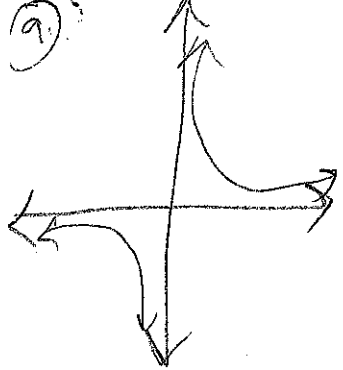
Determine whether the following equations and ordered pairs are linear or non-linear. Copy the chart below on to your own paper. You will need to write the equation and/or the ordered pairs (if ordered pairs are given you need to try and write an equation for the function), include a sketch of the graph, and explain why the equation or ordered pairs is linear or why it is nonlinear.

<p>① <math>y = 2x^3 + 5</math> Nonlinear</p>	<p>② <math>y = 2x - 4</math> Linear (<math>y = mx + b</math>)</p>	<p>③ <math>(0, 3), (1, 4), (2, 7), (3, 12)</math> Nonlinear (<math>y = x^2 + 3</math>)</p>	<p>④ <math>y = x^2</math> Nonlinear</p>
<p>⑤ <math>y = 2(x - 3) + 6(1 - x)</math> <math>y = -4x</math> Linear (<math>y = mx + b</math>)</p>	<p>⑥ <math>(1, 1), (3, 9), (4, 13)</math> Linear (<math>y = 4x - 3</math>)</p>	<p>⑦ <math>y = 22 - 2x</math> Linear (<math>y = mx + b</math>)</p>	<p>⑧ <math>y = x^2 + 1</math> Nonlinear</p>
<p>⑨ <math>y = \frac{4}{x}</math> Nonlinear</p>	<p>⑩ <math>y = 2^x</math> Nonlinear</p>	<p>⑪ <math>y = \frac{x}{2} - 4</math> Linear (<math>y = mx + b</math>)</p>	<p>⑫ <math>((0, 1), (3, 8), (4, 16))</math> Nonlinear</p>
<p>⑬ <math>y =  x  - 3</math> Nonlinear</p>	<p>⑭ <math>y = 2 - x</math> Linear (<math>y = mx + b</math>)</p>	<p>⑮ <math>y = x^3</math> Nonlinear</p>	<p>⑯ <math>y = 2x + x * x</math> Nonlinear</p>

$\frac{1}{3} = \frac{1}{3}$   
 $\frac{8}{1} = 8$

Linear			Nonlinear		
Equation &/or ordered pairs	Sketch	Why?	Equation &/or ordered pairs	Sketch	Why?





# Activity 1: Comparing Continuous and Discrete Data

## Student Worksheet:

### Scenario 2:

A local neighborhood community is asking everyone to participate in a new recycling program. At the end of each month, each house records the number of aluminum cans they recycle. The following data is compiled in the subsequent table.

House	Number of Cans
1	28
2	49
3	35
4	62
5	41

+1 (

} +21  
} -14  
} +27  
} -21

1. Does this table represent data that is "continuous" or "discrete"? Explain your answer using complete sentences.

This is discrete. They will only collect whole cans, not parts of cans.

2. Write an equation that models the data.

This data is nonlinear

3. Can you predict how many cans the 6th house on the block will recycle the next month?

No - the data shows an increase in cans at some houses, and a decrease at other houses.

Name Key

Date \_\_\_\_\_

# Activity 1: Comparing Continuous and Discrete Data

## Student Worksheet:

### Problems

#### Scenario 1:

Mark is working at the local fast food restaurant and earns \$7.15 per hour.

The following table shows the amount of money he earns by working a particular number of hours per week.

Hours Worked	Money Earned
1	\$7.15
3	\$21.45
7	\$50.05
12	\$85.80
15	\$107.25

+2<  
+4<  
+5<  
+3<

>+41.3  
>+28.6  
>+35.75  
>+21.45

$\frac{14.3}{2} = 7.15$   
 $\frac{28.6}{4} = 7.15$   
 $\frac{35.75}{5} = 7.15$   
 $\frac{21.45}{3} = 7.15$

1. Does this table represent data that is "continuous" or "discrete"? Explain your answer using complete sentences.

THIS IS CONTINUOUS. YOU CAN WORK  $1\frac{1}{2}$  HOURS OR  $3\frac{3}{4}$  HOURS, SO WE HAVE POINTS IN BETWEEN THE VALUES IN THE TABLE.

2. Write an equation that models the data.

$$y = 7.15x$$

3. Use the equation to predict what Mark's salary will be if he works 40 hours.

$$y = 7.15(40)$$

$y = 286$  He will make \$286.



# 4-4

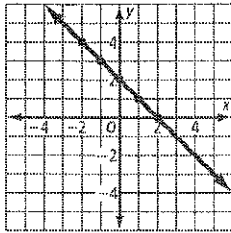
## Practice

Form G

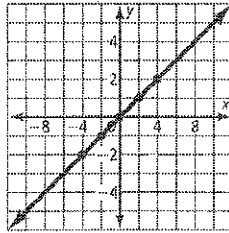
### Graphing a Function Rule

Graph each function rule.

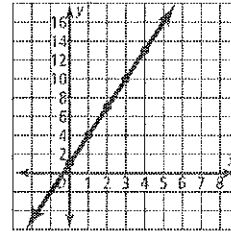
1.  $y = 2 - x$



2.  $y = \frac{1}{2}x$

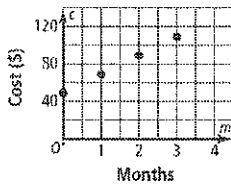


3.  $y = 3x + 1$



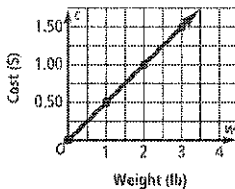
Graph each function rule. Tell whether the graph is *continuous* or *discrete*.

4. The cost  $C$ , in dollars, for a health club membership depends on the number  $m$  of whole months you join. This situation is represented by the function rule  $C = 49 + 20m$ .



Choose intervals of 1 for the  $m$ -axis because the cost is for every 1 month; Choose intervals of 20 for the  $C$ -axis because that is the cost increment per month; discrete function

5. The cost  $C$ , in dollars, for bananas depends on the weight  $w$ , in pounds, of the bananas. This situation is represented by the function rule  $C = 0.5w$ .



Choose intervals of 1 for the  $w$ -axis because the cost can be measured for every 1 pound; Choose intervals of 0.50 for the  $C$ -axis because that is the cost increment per pound; continuous function

# 4-4

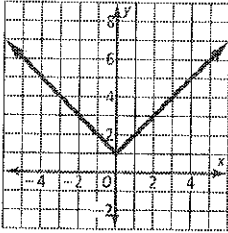
## Practice (continued)

Form G

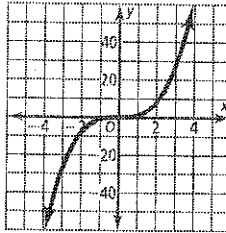
### Graphing a Function Rule

Graph each function rule.

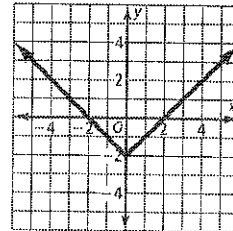
6.  $y = |x| + 1$



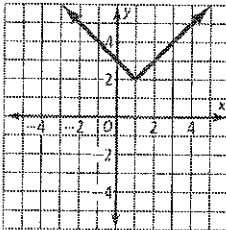
7.  $y = x^3$



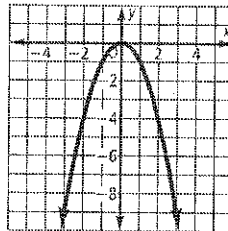
8.  $y = |x| - 2$



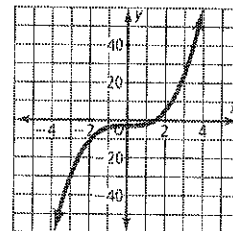
9.  $y = |x - 1| + 2$



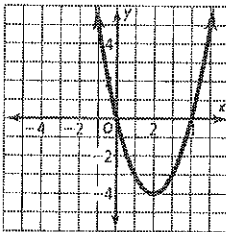
10.  $y = -x^2$



11.  $y = x^3 - 3$



12. **Open-Ended** Sketch a graph of a quadratic function that has  $x$ -intercepts at 0 and 4. Sample graph:



13. **Writing** Describe the general shape of the graphs of functions of the form  $y = ax^3$ .

The function  $y = ax^3$  passes through the origin with branches in the first and third quadrants. When  $|a| > 1$ , the graph is stretched. When  $0 < |a| < 1$ , the graph is compressed. When  $a$  is negative, the graph is a reflection in the  $y$ -axis.

## 4-4

## Standardized Test Prep

## Graphing a Function Rule

## Multiple Choice

For Exercises 1–4, choose the correct letter.

1. Which table of values can be used to graph the function  $y = -4x + 3$ ? C

A.

x	y
-1	-1
0	3
1	7
2	11

C.

x	y
0	3
1	-1
2	-5
3	-9

B.

x	y
-3	-9
-1	-1
1	7
3	15

D.

x	y
0	3
1	7
2	11
3	15

2. Which term best describes a function whose graph is composed of isolated points? H  
 F. continuous      G. linear      H. discrete      I. nonlinear
3. Which relationship is continuous? D  
 A. the number of cows a farmer has owned over the years  
 B. the number of cookies Stan baked for the party  
 C. the number of people attending the assembly  
 D. the distance a runner ran during training
4. The total cost  $c$  a painter charges to paint a house depends on the number  $h$  of hours it takes to paint the house. This situation can be represented by the function rule  $c = 15h + 245$ . What is the total cost if the painter works for 30.25 hours? I  
 F. \$245      G. \$453.75      H. \$572.75      I. \$698.75

## Short Response

5. The profit  $y$  on the number  $x$  of items a store sells is represented by the rule  $y = 2x - 1$ . What does a table of values for the function rule and the graph of the function look like?  
 [2] Both parts answered correctly.  
 [1] One part answered correctly.  
 [0] Neither part answered correctly.

x	y
1	1
2	3
3	5
4	7

