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Additional Practice (continued)
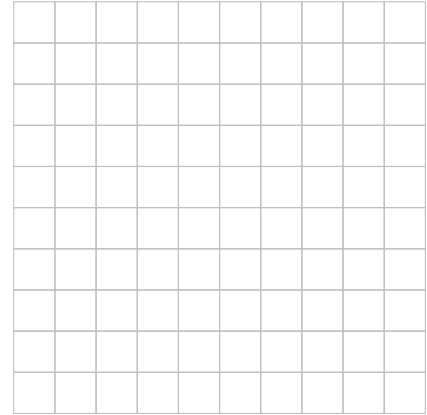
16. For parts (a)–(c), write an equation and sketch a graph for a line that meets the given conditions. Use one set of axes for all three graphs.

a. A line with slope $-\frac{1}{2}$ and y-intercept $(0, 3)$

b. A line parallel to the line drawn in part (a) with a y-intercept greater than 3

c. A line parallel to the line drawn in parts (a) and (b) with a y-intercept less than 3

d. What do you notice about the equations and graphs of the three lines?

17. a. Predict how high a stack of 10 cups would be.

Stack of Styrofoam Cups

Number of Cups	1	2	3	4
Height of the Stack of Cups (cm)	7	8	9	10

b. Describe the pattern in words.

c. Describe the pattern with an equation. Let x represent the number of cups and h represent the height.

d. What does the coefficient of x mean in this context? Does it have a unit of measure? Explain.

e. What does the constant term mean in this context? Does it have a unit of measure? Explain.
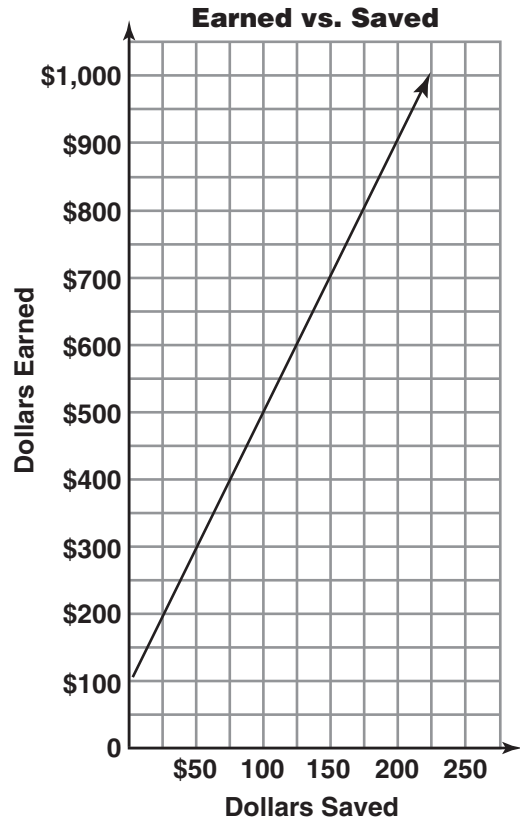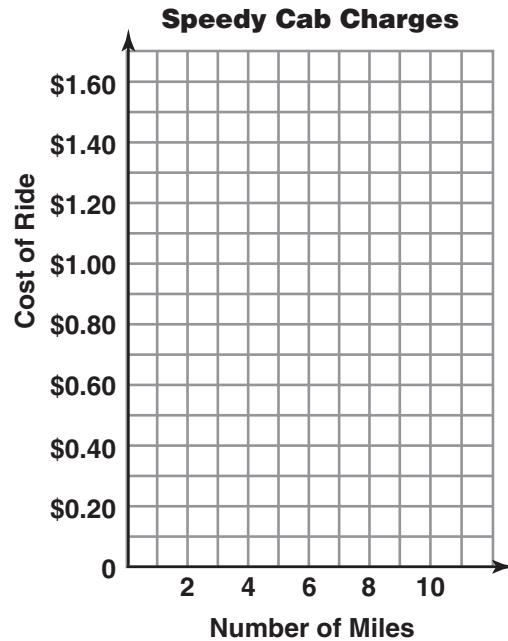
Skill: Using Linear Models

Thinking With Mathematical Models

For Exercises 1–5, use the graph at the right.

1. What earnings will produce $225 in savings?

2. How much is saved from earnings of $400?

3. What is the slope of the line in the graph?

4. For each increase of $200 in earnings, what is the increase in savings?

5. Write an equation for the linear function.

Earned vs. Saved

[Graph: y-axis labeled "Dollars Earned" from 0 to $1,000 in increments of $100; x-axis labeled "Dollars Saved" from $50 to 250 in increments of 50. A straight line rises from about ($0, $100) to upper right.]

6. A ride in a cab costs $0.40 plus $0.15 per mile.

   a. Write and graph an equation for the linear function that models traveling x miles in the cab.

   b. The cab charges $0.70 for a ride of how many miles?

   c. How much does the cab charge for a trip of 8 miles?

Speedy Cab Charges

[Graph: y-axis labeled "Cost of Ride" from 0 to $1.60 in increments of $0.20; x-axis labeled "Number of Miles" from 2 to 10 in increments of 2.]

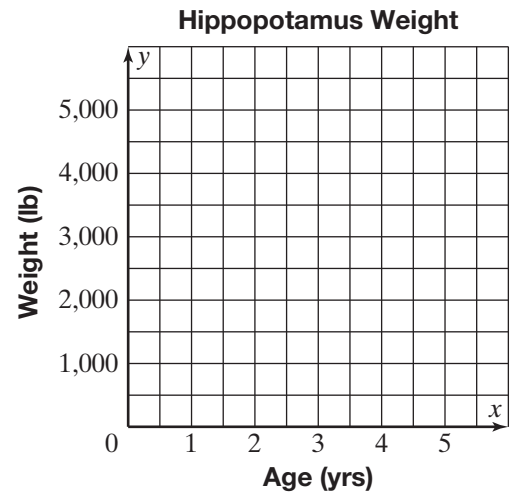## Skill: Using Linear Models *(continued)*

A giraffe was 1 foot tall at birth, 7 feet tall at the age of 4, and $11\frac{1}{2}$ feet tall at the age of 7.

7. Plot the data.

8. Draw a line that models the pattern in the data.

9. Write an equation for the linear function.

10. Use your function to find the following information.

    a. the giraffe's height at the age of 5

    b. the age at which the giraffe was 16 feet tall

Giraffe Height

Height (ft) vs *Age (yrs)*
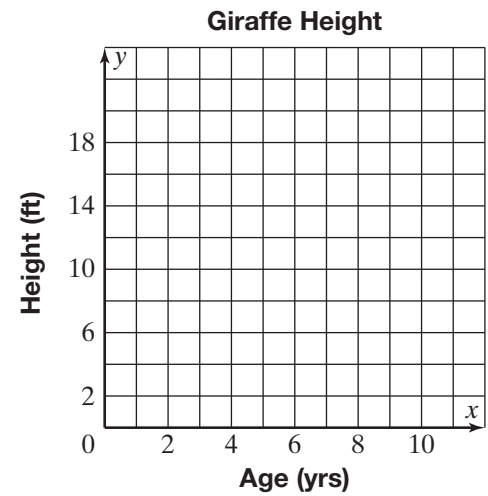
A hippopotamus weighed 700 pounds at the age of 1, 1,900 pounds at the age of 3, and 2,500 pounds at the age of 4.

11. Plot the data.

12. Draw a line that models the pattern in the data.

13. Write an equation for the linear function.

14. Use your function to predict the following information.

    a. the hippo's weight at the age of 6

    b. the age at which the hippo weighed 4,300 pounds

Hippopotamus Weight

Weight (lb) vs *Age (yrs)*

Skill: Using Linear Models *(continued)*

Thinking With Mathematical Models

Horace has a small flock of chickens. He tracks the relationship between the number of hours of sunlight and the total number of eggs he gets in a day. He records his data from different dates in this table.

Date	Feb 1	Apr 1	Jun 1	Jul 1	Sep 1	Oct 1	Dec 1
Number of Eggs	4	14	18	19	14	11	0
Hours of Sunlight	10	12.5	14.5	14.5	13	12	9.5

15. Graph the data. Draw a line that models the pattern in the data.

Egg Output
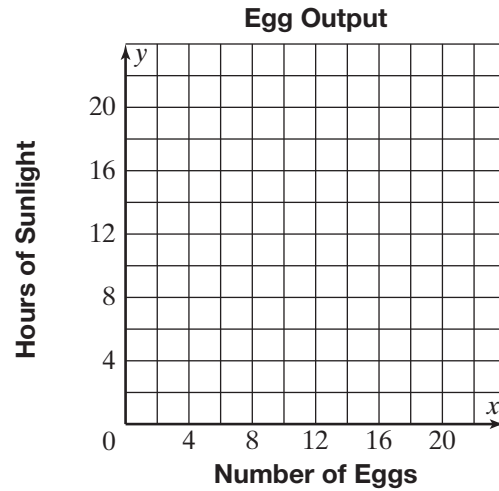
16. Write an equation for the linear function that models the relationship for hours of sunlight, s, in terms of the number of eggs collected, n.

17. a. Use your equation to predict the number of hours of sunlight that are needed for Horace's flock to produce 20 eggs per day.

b. Use your equation to predict the number of eggs Horace's flock would produce with 16 hours of sunlight.

18. What do the values of m and b in the equation $s = mn + b$ tell you about the rate of egg production?
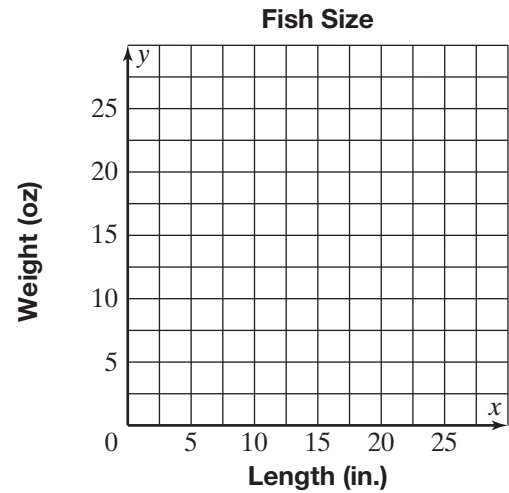
Skill: Using Linear Models (continued)

Thinking With Mathematical Models

A fisherman recorded the size and weight of the fish he caught on a fishing trip. The lengths are recorded in the table.

Length (in.)	5	6	6.5	7	8	8	9	10	12	15
Weight (oz)	9	11	12	12.5	13	14	15	17	20	25

19. Graph the data. Draw a line that models the pattern in the data.

Fish Size

20. Write an equation for the linear function that models the relationship for the fish weight, w, in terms of fish length, l.

21. Use your equation to predict the weight of a fish that measures 4 inches long.

22. Why might predicting the weight of a fish by the measurement of its length not be accurate?

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Skill: Writing Equations of Lines

Write an equation for the line through the given points or through the given point with the given slope.

1. $(5, 7), (6, 8)$ **2.** $(-2, 3); \text{slope} = -1$

3. $(1, 2), (3, 8)$ **4.** $(-2, 3); \text{slope} = 4$

5. $(4, 7); \text{slope} = \frac{3}{2}$ **6.** $(6, -2); \text{slope} = -\frac{4}{3}$

7. $(0, 5), (-3, 2)$ **8.** $(8, 11), (6, 16)$