

11. A family drove to their grandmother's house. After that they averaged 200 miles per day for 8 days. They drove a total of 1,880 miles over the eight days. Assume the relationship is linear. Find and interpret the rate of change and initial value.

The family drove 200 miles per day. They drove 280 miles to their grandmother's house.

12. **CCSS Multiple Representations** Monique and Tasha are traveling on the same highway to a family reunion at a park. Monique starts out 225 miles from the park and drives 70 miles per hour. Tasha starts out 200 miles from the park and drives 65 miles per hour.

- a. **Algebra** Write an equation for Monique's trip where y is the total distance from the park after x hours.

$y = 225 - 70x$

- b. **Algebra** Write an equation for Tasha's trip where y is the total distance from the park after x hours. **$y = 200 - 65x$**

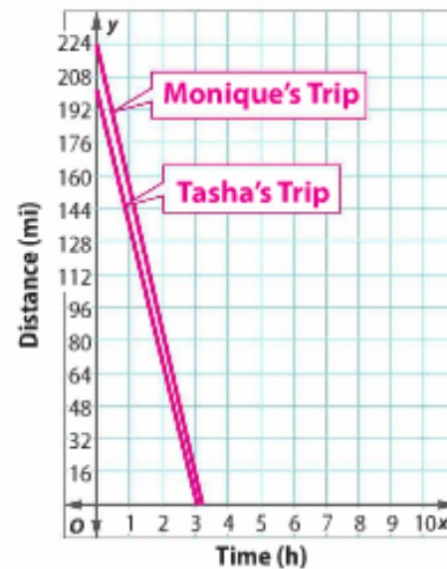
- c. **Graphs** Graph both equations on the same coordinate plane.

- d. **Words** Will Monique's and Tasha's trip overlap before they reach the park? Explain your reasoning.

No; the lines do not intersect.

- e. **Numbers** Interpret the initial value of each function.

Monique begins her trip 225 miles from the park. Tasha begins her trip 200 miles from the park.





Nonlinear; rate of change is not constant. As x increases by 2, y increases by a greater amount each time. The rate of change is not constant, so this function is nonlinear.

Linear; rate of change is constant; as x increases by 4, y decreases by 3.

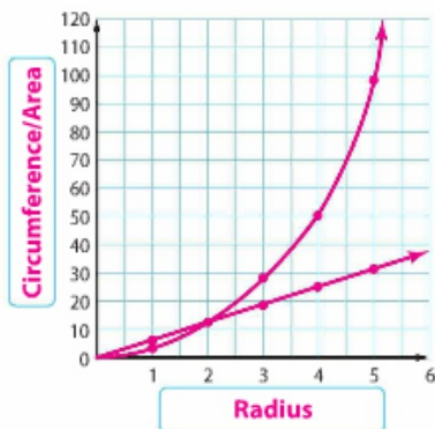
18. Copy and Solve The area of a square is a function of its perimeter. Graph the function on a separate sheet of grid paper. Explain whether the function is linear and if the graph is increasing or decreasing. **See margin.**

19. CCSS Multiple Representations Recall that the circumference of a circle is equal to two times π times its radius and that the area of a circle is equal to π times the square of the radius.

a. Tables Complete the table showing the circumference and area of circles with radius r .

Radius r	Circumference $2 \cdot \pi \cdot r$	Area πr^2
1	$2 \cdot \pi \cdot 1 \approx 6.28$	$\pi \cdot 1^2 \approx 3.14$
2	$2 \cdot \pi \cdot 2 \approx 12.57$	$\pi \cdot 2^2 \approx 12.57$
3	$2 \cdot \pi \cdot 3 \approx 18.85$	$\pi \cdot 3^2 \approx 28.27$
4	$2 \cdot \pi \cdot 4 \approx 25.13$	$\pi \cdot 4^2 \approx 50.27$
5	$2 \cdot \pi \cdot 5 \approx 31.42$	$\pi \cdot 5^2 \approx 78.54$

b. Graphs Graph the ordered pairs (radius, circumference) and (radius, area) for each function on the same coordinate plane.

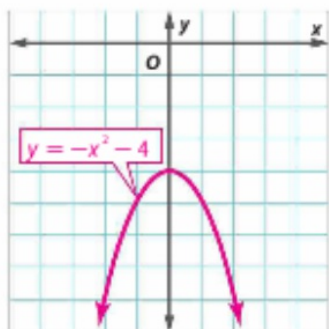


c. Words Is the circumference of a circle a linear or nonlinear function of its radius? the area?

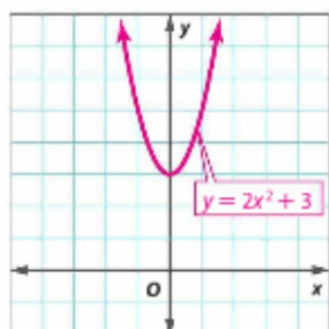
Explain your reasoning. **Circumference: linear; sample answer: When the ordered pairs are graphed, the points fall in a line. Area: nonlinear; sample answer: When the ordered pairs are graphed, the points do not fall in a line.**



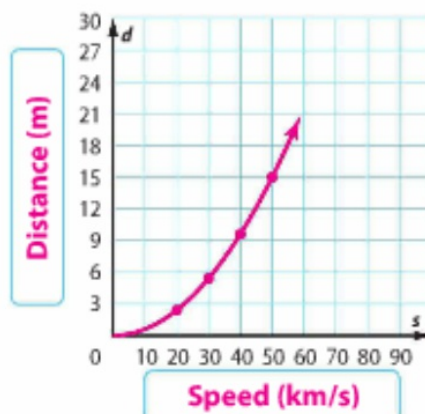
16. $y = -x^2 - 4$



17. $y = 2x^2 + 3$

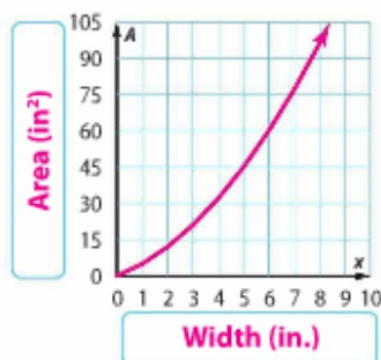


18. The function $d = 0.006s^2$ represents the braking distance d in meters of a car traveling at a speed s in kilometers per second. Graph this function. Then use your graph to estimate the speed of the car if its braking distance is 12 meters. about 45 km/s



19. **CCSS Model with Mathematics** Annika is making a fabric memo board. The width of the board is x inches, and the length of the board is $(x + 4)$ inches.

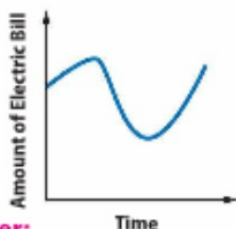
- Write a function that represents the area A of the memo board. $A = x^2 + 4x$
- Graph the function.
- If the width of the memo board is 8 inches, what is its area? 96 in^2



Time

Justine rode her bike at a constant rate in the beginning. She then stopped riding for a period of time. Then she continued riding at a constant rate.

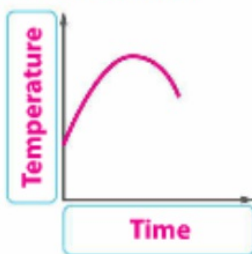
11. A graph of Mrs. Fraser's electric bill throughout the year is shown below. Describe the change in the bill over time.



Sample answer: Mrs. Fraser's electric bill starts out high in January, increases until about March, and then decreases throughout the spring and summer. In the fall, the electric bill increases again.

13. **CCSS Model with Mathematics** The outside temperature rises throughout the day at varied rates, then drops at night. Sketch a qualitative graph to represent the situation.

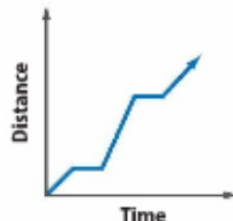
Sample answer:



Time

Sample answer: The temperature cools down rapidly in the beginning. Then it cools down at a slower rate and levels off.

12. The graph below displays the distance covered on a long road trip. Describe the change in the distance over time.



Sample answer: The graph shows the car traveling at a constant speed then stopping, and then moving at a faster speed. The car stops a second time, then continues traveling.

14. A lion cub is resting in the grass. He sees another lion cub nearby and races after it, picking up speed as it runs. Sketch a qualitative graph to represent the situation.

Sample answer:

