THINKING WRITING

# 4.B Direct Variation

**You will need:**

graph paper

## POINTS ON LINES

**1.** Choose a number $m$, and draw the graph of the equation $y = mx$. Choose any point $(a, b)$ on the line.

a. Is the point $(2a, 2b)$ on the line?

b. Is the point $(3a, 3b)$ on the line?

c. Is the point $(ka, kb)$ on the line for any value of $k$?

**2.** Refer to the line you drew in problem 1.

a. Is the point $(a + 1, b + 1)$ on it?

b. Is the point $(a + k, b + k)$ on the line for any value of $k$?

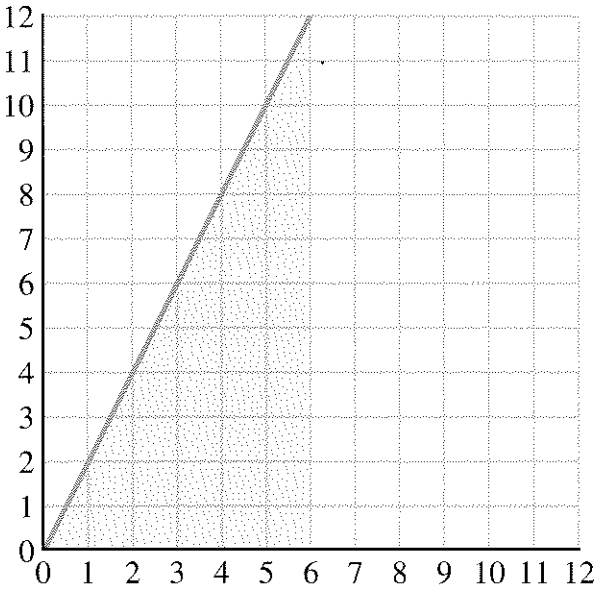
**3.** **Report** Repeat problems 1 and 2 for several graphs of the form $y = mx$, $y = x + b$, and $y = mx + b$. If a point $(a, b)$ is on the line, in what case is $(ka, kb)$ on the line? What about $(a + k, b + k)$?

## AREA FUNCTIONS

**4.** The graph shows $y = 2x$. The region between the line and the $x$-axis from $x = 0$ to $x = 6$ is shaded.

a. What is the area of the shaded region?

b. What is the area of the region between the line and the $x$-axis from $x = 0$ to $x = 4$?




| Endpoint | Area |
|---|---|
| $x = 1$ | |
| $x = 2$ | |
| $x = 3$ | |
| $x = 5$ | |
| $x = a$ | |

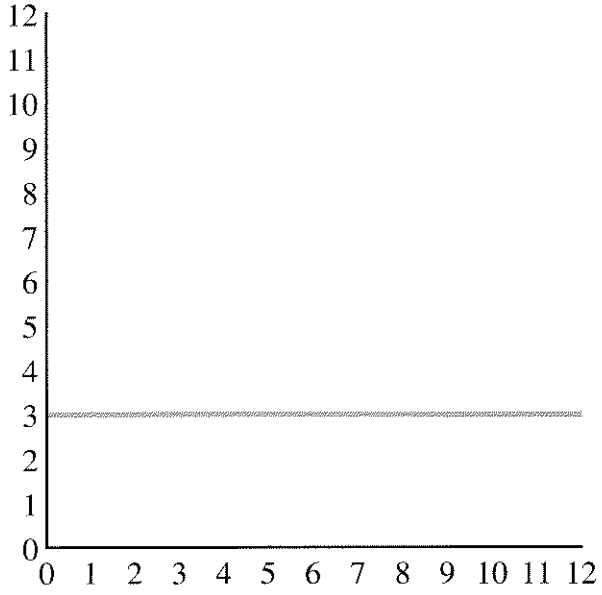
**5.** Copy and complete the table giving the area between the line and the $x$-axis from $x = 0$ to the given endpoint value of $x$.

**6.** Find a function relating the area to the endpoint value of $x$.

**7.** Is the area function you wrote an example of direct variation? Explain.

| Endpoint | Area |
|---|---|
| $x = 1$ | |
| $x = 2$ | |
| $x = 3$ | |
| $x = 5$ | |
| $x = a$ | |

**8.** The graph shows the line $y = 3$. Copy and complete the table giving the area between the line and the $x$-axis from $x = 0$ to the given endpoint value of $x$.




**9.** Find a function relating the area to the endpoint value of $x$.

**10.** Is the area function you wrote an example of direct variation? Explain.

**11.** **Report** Repeat problems 4 through 7 for several other lines. For which lines did you find area functions that are examples of direct variation? What generalizations can you make? Write an illustrated report about your results.