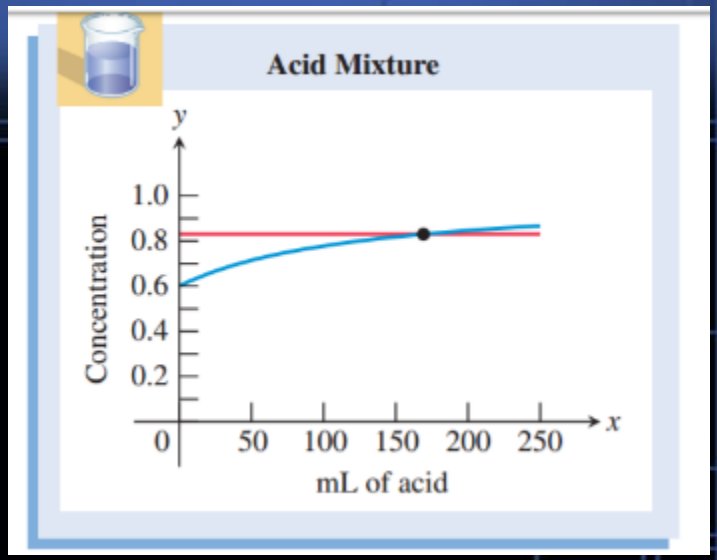
32. Acid Mixture Suppose that x mL of pure acid are added to 100 mL of a 35% acid solution.

(a) Express the concentration $C(x)$ of the new mixture as a function of x.



(b) Use a graph to determine how much pure acid should be added to the 35% solution to produce a new solution that is 75% acid.

(c) Solve (b) algebraically.

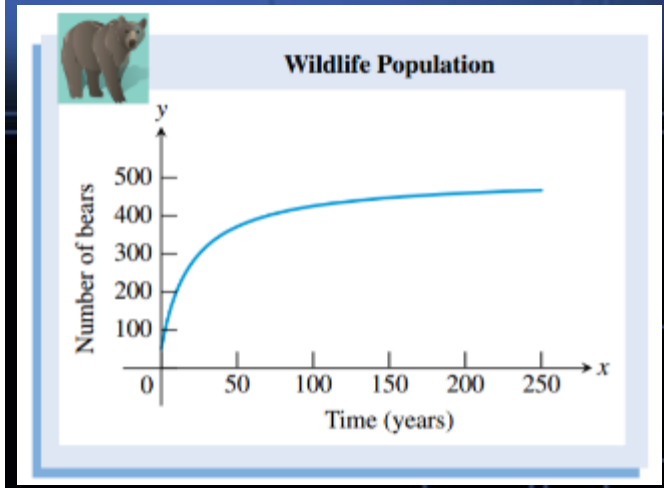
34. Bear Population The number of bears at any time t (in years) in a federal game reserve is given by

$$P(t) = \frac{500 + 250t}{10 + 0.5t}.$$

(a) Find the population of bears when the value of t is 10, 40, and 100.

(b) Does the graph of the bear population have a horizontal asymptote? If so, what is it? If not, why not?

(c) Writing to Learn According to this model, what is the largest the bear population can become? Explain your answer.



35. Minimizing Perimeter Consider all rectangles with an area of 182 ft^2. Let x be the length of one side of such a rectangle.

(a) Express the perimeter P as a function of x.

(b) Find the dimensions of the rectangle that has the least perimeter. What is the least perimeter?

36. Group Activity Page Design Hendrix Publishing Co. wants to design a page that has a 0.75-in. left border, a 1.5-in. top border, and borders on the right and bottom of 1-in. They are to surround 40 in.^{2} of print material. Let x be the width of the print material.

(a) Express the area of the page as a function of x.

(b) Find the dimensions of the page that has the least area. What is the least area?

37. Industrial Design Drake Cannery will pack peaches in 0.5-L cylindrical cans. Let x be the radius of the can in cm.

(a) Express the surface area S of the can as a function of x.

(b) Find the radius and height of the can if the surface area is 900 cm^2.

43. Fast Food Sales The total amount in sales in billions of dollars by fast food business for several years is given in Table 2.20. Let $x = 0$ represent 1990, $x = 1$ represent 1991, and so forth. A model for the data is given by

$$y = 120 - \frac{500}{x + 8}$$

(a) Graph the model together with a scatter plot of the data.

(b) Use the model to estimate the amount of sales by fast food business in 2005.

Table 2.20 Fast Food Sales

Year	Amount (in billions)
1992	70.6
1993	74.9
1994	78.5
1995	82.5
1996	85.9
1997	88.8
1998	92.5
1999	97.5
2000	101.4
2001	105.5

Source: Technomic, as reported in USA Today July 3–4, 2002.