

2-5 Word Problem Practice

Rational Functions

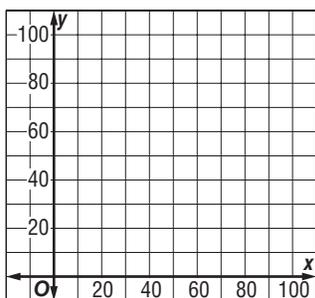
1. **POLLUTION** A cost-benefit model may be used to express the cost of cleaning up environmental pollution as a function of the percent of pollution removed from the environment. A typical model is

$$C(x) = \frac{8.9x}{100 - x}$$

- a. Determine any asymptotes and intercepts for the function.

- b. State the relevant domain of the function.

- c. Graph the function.



2. **MEDICINE** The concentration of a certain medicine in a person's body after x hours is modeled by $f(x) = \frac{35x}{x^2 + 10}$. Determine any asymptotes and intercepts for the function.

3. **ADVERTISING** The function $f(x) = \frac{6x^2 + x}{x + 1}$ gives the approximate number of new Web site hits a company will receive after x minutes of television advertising. Determine any asymptotes for the function.

4. **PETS** Candice is designing a play center for the cats in a shelter. She is considering a center that is multi-level and cylindrical in shape. She would carpet each level and has 4000 square inches of available carpet. The function $f(r) = \frac{4000}{\pi r^2}$ gives the number of levels she can make if each level has a radius of r inches.

- a. Graph the function using a graphing calculator.

- b. Graph the line $y = 8$ and find the intersection to determine the radius of each level if she has enough carpet to make at most 8 levels. Round to the nearest tenth.

5. **PACKAGING** The surface area of a box with a volume of 625 cubic inches is given by $S(x) = 2x^2 + \frac{2500}{x}$, where x is a side length of the square base.

- a. Write the function as the quotient of two functions.

- b. Determine any asymptotes and intercepts for the function.

- c. Find the side length of the base when the surface area is 512.5 square inches.