

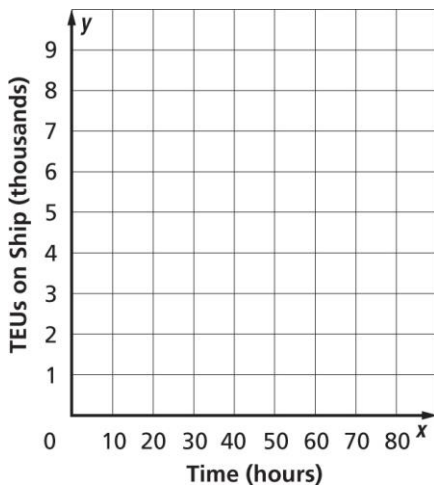
# 3-1 Word Problem Practice

## Graphing Linear Functions

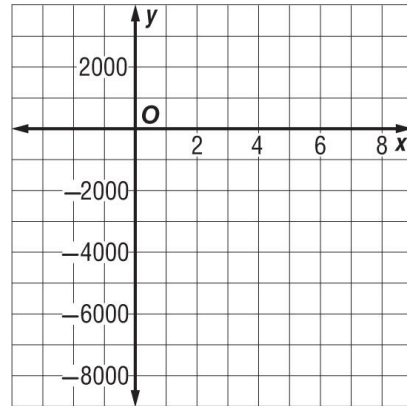
**1. FOOTBALL** One football season, the Carolina Panthers won 4 more games than they lost. This can be represented by  $y = x + 4$ , where  $x$  is the number of games lost and  $y$  is the number of games won. Write this linear equation in standard form.

**2. TOWING** Pick-M-Up Towing Company charges \$40 to hook a car and \$1.70 for each mile that it is towed. The equation  $y = 1.7x + 40$  represents the total cost of  $y$  dollars for  $x$  miles towed. Determine the  $y$ -intercept. Describe what the value means in this context.

**3. SHIPPING** The *OOCL Shenzhen*, one of the world's largest container ships, carries 8063 TEUs (1280 cubic feet containers). Workers can unload a ship at a rate of a TEU every minute. Using this rate, write and graph an equation to determine how many hours it will take the workers to unload half of the containers from the *Shenzhen*.



**4. BUSINESS** The equation  $y = 1000x - 5000$  represents the monthly profits of a start-up dry cleaning company. Time in months is  $x$  and profit in dollars is  $y$ . The first date of operation is when time is zero. However, preparation for opening the business began 3 months earlier with the purchase of equipment and supplies. Graph the linear function for  $x$ -values from  $-3$  to 8.



**5. BONE GROWTH** The height of a woman can be predicted by the equation  $h = 81.2 + 3.34r$ , where  $h$  is her height in centimeters and  $r$  is the length of her radius bone in centimeters.

a. Is this a linear function? Explain.

b. What are the  $r$ - and  $h$ -intercepts of the equation? Do they make sense in the situation? Explain.

c. Use the function to find the approximate height of a woman to the nearest centimeter whose radius bone is 25 centimeters long.

## 3-2 Word Problem Practice

### Zeros of Linear Functions

**1. PET CARE** You buy a 6.3-pound bag of dry cat food for your cat. The function  $c = 6.3 - 0.25p$  represents the amount of cat food  $c$  remaining in the bag when the cat is fed the same amount each day for  $p$  days. Find the zero of this function. Describe what this value means in this context.

**2. SAVINGS** Jessica is saving for college using a direct deposit from her paycheck into a savings account. The function  $m = 3045 - 52.50t$  represents the amount of money  $m$  still needed after  $t$  weeks. Find the zero of this function. What does this value mean in this context?

**3. FINANCE** Michael borrows \$100 from his dad. The function  $v = 100 - 4.75p$  represents the outstanding balance  $v$  after  $p$  weekly payments. Find the zero of this function. Describe what this value means in this context.

**4. BAKE SALE** Ashley has \$15 in the Pep Club treasury to pay for supplies for a chocolate chip cookie bake sale. The function  $d = 15 - 0.08c$  represents the dollars  $d$  left in the club treasury after making  $c$  cookies. Find the zero of this function. What does this value represent in this context?

**5. DENTAL HYGIENE** You are packing your suitcase to go away to a 14-day summer camp. The store carries three sizes of tubes of toothpaste.

Tube	Size (ounces)	Size (grams)
A	0.75	21.26
B	0.9	25.52
C	3.0	85.04

Source: National Academy of Sciences

a. The function  $n = 21.26 - 0.8b$  represents the number of remaining brushings  $n$  using  $b$  grams per brushing using Tube A. Find the zero of this function. Describe what this value means in this context.

b. The function  $n = 25.52 - 0.8b$  represents the number of remaining brushings  $n$  using  $b$  grams per brushing using Tube B. Find the zero of this function. Describe what this value means in this context.

c. Write a function to represent the number of remaining brushings  $n$  using  $b$  grams per brushing using Tube C. Find the zero of this function. Describe what this value means in this context.

d. If you will brush your teeth twice each day while at camp, which is the smallest tube of toothpaste you can choose? Explain your reasoning.

# 3-3 Word Problem Practice

## Rate of Change and Slope

**1. HIGHWAYS** Roadway signs such as the one below are used to warn drivers of an upcoming steep down grade that could lead to a dangerous situation. What is the grade, or slope, of the hill described on the sign?



**2. AMUSEMENT PARKS** The SheiKra roller coaster at Busch Gardens in Tampa, Florida, features a 138-foot vertical drop. What is the slope of the coaster track at this part of the ride? Explain.

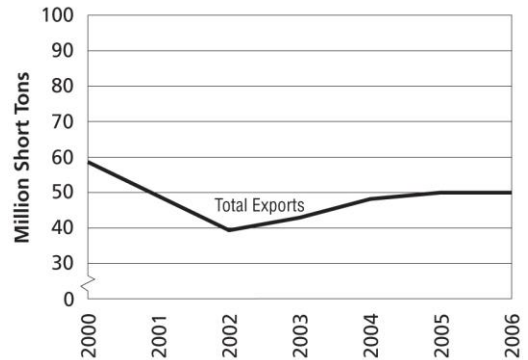
**3. CENSUS** The table shows the population density for the state of Texas in various years. Find the average annual rate of change in the population density from 2000 to 2009.

Population Density	
Year	People Per Square Mile
1930	22.1
1960	36.4
1980	54.3
2000	79.6
2009	96.7

Source: Bureau of the Census, U.S. Dept. of Commerce

**4. REAL ESTATE** A realtor estimates the median price of an existing single-family home in Cedar Ridge is \$221,900. Two years ago, the median price was \$195,200. Find the average annual rate of change in median home price in these years.

**5. COAL EXPORTS** The graph shows the annual coal exports from U.S. mines in millions of short tons.



Source: Energy Information Association

- What was the rate of change in coal exports between 2001 and 2002?
- How does the rate of change in coal exports from 2005 to 2006 compare to that of 2001 to 2002?
- Explain the meaning of the part of the graph with a slope of zero.