

LESSON
25

Solving Problems with Linear Equations

Review It!

You can use a linear equation to model and solve many word problems.

A company manufactures pogo sticks. Each pogo stick costs \$5 to make. The company's fixed cost of doing business is \$2,000 per week. What are the total expenses if the company makes 1,000 pogo sticks in a week? Or 5,000 pogo sticks in a week?

Step 1 Choose variables for the unknown amounts.

Let p = number of pogo sticks
Let T = total expenses

Step 2 Write an equation.

$$\text{total expenses} = \text{cost of making } p \text{ pogo sticks} + \text{fixed cost}$$

$$T = \underbrace{\quad}_p + \underbrace{\quad}$$

THINK This is the cost to make 1 pogo stick.

Step 3 Substitute values into the equation. Solve for T .

Total weekly expenses for making 1,000 pogo sticks:

$$T = 5p + 2,000 = 5 \times \quad + 2,000 = \quad$$

Total weekly expenses for making 5,000 pogo sticks:

$$T = 5p + 2,000 = 5 \times \quad + 2,000 = \quad$$

THINK This weekly cost does not change.

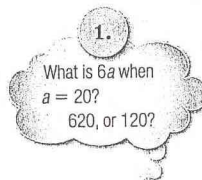
So, the total expenses in a week are _____ to make 1,000 pogo sticks or _____ to make 5,000 pogo sticks.

Try It!

Evaluate each formula for the given values.

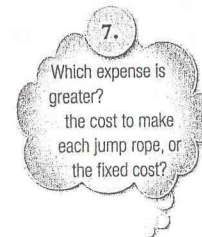


- | | |
|---|--|
| 1. $T = 6a + 50$, when $a = 20$, and $a = 30$ | 2. $T = 10c + 500$, when $c = 100$, and $c = 300$ |
| _____ | _____ |
| 3. $C = 18d + 100$, when $d = 100$, and $d = 1,000$ | 4. $C = 200f + 750$, when $f = 500$, and $f = 5,000$ |
| _____ | _____ |
| 5. $P = 11a - 25$, when $a = 100$, and $a = 200$ | 6. $P = 4m - 20$, when $m = 500$, and $m = 1,000$ |
| _____ | _____ |



Write an equation. Then solve the equation and answer the question.

7. A company manufactures jump ropes. Each jump rope, j , costs \$1 to make. The company's fixed cost of doing business is \$2,500 per week. What are the company's total expenses, T , if the company makes 600 jump ropes in a week? 2,000 jump ropes in a week?
- _____
8. A taxi company charges a flat fee of \$25 plus \$2 for every mile, m . What is the total cost, C , of a 25-mile trip? a 40-mile trip?
- _____



Algebra

On Your Own!

Circle the best answer for each question.

- A company manufactures electric drills. Each electric drill costs \$18 to make. The company's fixed cost of doing business is \$6,500 per week. What are the company's total expenses if the company makes 800 electric drills in a week?

A. \$14,400 C. \$19,900
B. \$15,050 D. \$20,900
- A limousine company charges a flat fee of \$100 plus \$135 per hour. What is the total cost of a 6-hour trip?

A. \$710 C. \$910
B. \$810 D. \$1,010
- Arthur has \$650 in a savings account. He puts \$75 each month into the account. How much money will he have in the savings account 8 months from now?

A. \$600 C. \$1,250
B. \$1,200 D. \$5,800
- Tyler made a \$25 down payment on a bicycle. His monthly payments are \$28.95 per month. If he has 12 monthly payments, what is the total cost of the bicycle?

A. \$312.40 C. \$347.40
B. \$322.40 D. \$372.40
- A company manufactures fence posts. Each fence post costs \$2 to make. The company's fixed cost of doing business is \$4,800 per week. What are the company's total expenses if the company makes 2,000 fence posts in a week?

A. \$8,800 C. \$5,000
B. \$5,200 D. \$4,000
- A taxi company charges a flat fee of \$15 plus \$4 per mile. What is the total cost of a 30-mile trip?

A. \$570 C. \$120
B. \$135 D. \$90
- A shuttle company charges a flat fee of \$35 plus \$2 per mile. What is the total cost of a 60-mile trip?

A. \$2,220 C. \$120
B. \$155 D. \$95
- Shelly has saved \$245. If she saves \$115 each month, how much money will she have saved 12 months from now?

A. \$1,625 C. \$1,380
B. \$1,525 D. \$245

- A company manufactures pans. Each pan, p , costs \$8 to make. The company's fixed cost of doing business is \$2,700 per week.

Part A Write an equation to show the company's total expenses, T , in one week.

Part B Use the equation to find the company's total expenses to manufacture 500 pans in a week, and the company's total expenses to manufacture 1,000 pans in a week.

Math Words

Fill in the blanks.

- When you solve a word problem, the first step is to choose _____.
- For the equation $T = 95b + 245$, to find the value of T when $b = 80$, _____ 80 for b in the _____, and then simplify.