Unit 4 Objective 7

Writing and Applying Linear Models

Example One

Membership to the local gym costs $99 plus a monthly fee of $25.

a. Write an equation that represents cost C of being a member for m months.

Since it cost $25 each month, this is the slope. $m = 25.$
The one-time fee of $99 is the y-intercept. $b = 99$
Using these two values, write the equation. $C = 25m + 99$

b. How much would it cost to be a member for 24 months?
Substitute 24 in for m and solve for C.

$$C = 25(24) + 99$$
$$C = \$699$$

It costs $699 for 24 months at the local gym.

c. If it cost $249, for how many months would you be a member?
Substitute $249 for C and solve for m.

$$249 = 25m + 99$$
$$150 = 25m$$
$$m = 6$$

6 months cost $249 at the local gym.

Try These

1. Jillian is opening a new savings account with a gift of $200 from her grandmother. She plans of putting $25 each week into the account.
   a. Write an equation for the total savings S of putting money in the savings account for w weeks.

   b. How much would she have after 8 weeks?

2. Steven wants to have a stand at a fair to sell personalized license plates. It costs $100 per day after paying a setup fee of $500.
   a. Write an equation for the total cost C of having the stand for d days.

   b. If it cost Steven $1,300, how many days was he at the fair?

3. You want to have your lawn treated by a local lawn company. It will cost \$150 to have your lawn evaluated and \$300 per quarter of a year to have treatments given to your lawn.
   a. Write an equation for the total cost C to have your lawn treated q quarters of a year.

   b. How much would it cost for 2 years?

Example Two

Bruce is having electrical problems and calls an electrician. The electrician charges a service fee plus \$32 per hour he works. For two hours of work he charges \$103 and for five hours of work he charges \$199.

Write an equation that represents cost C of hiring the electrician for h hours of work.

Since it cost \$32 per hour, the slope is 32. $m = 32$

From the problem, we write two points. $(2, 103),\ (5,\ 199)$

We must find the y-intercept using the slope $m = 32$ and one of the points $(2,\ 103)$.

$$y = mx + b$$
$$103 = 32(2) + b$$
$$103 = 64 + b$$
$$b = 39$$

Using these two values, write the equation. $C = 32h + 39$

Try These

4. To order boxes of paper for a company, the options are 10 boxes for \$150 and 15 boxes for \$200.
   a. Write an equation for the cost C of b number of boxes of paper.

   b. How much would it cost for 75 boxes of paper?

5. At a bridal store, 2 bridesmaid dresses cost \$900 and 5 bridesmaid dresses cost \$1800.
   a. Write an equation for the C cost of d dresses.

   b. How many bridesmaid dresses could be bought with \$2400?

6. When Paula orders books online for her book club, she must pay a shipping fee in addition to the cost of each book. She ordered 35 books and it cost her $152. On her next order, it cost her $140 for 32 books.
    a. Write an equation for the total cost C of b number of books.

    b. How much would it cost if she ordered 10 books?

    c. Paula received a bill that stated she owed $116. How many books did she order?

7. Jillian has her own business selling pastries. When a customer uses a credit card, she must pay the credit card company a flat fee plus a fee per transaction. In the month of May she had 54 credit card transactions that cost her $89. In the month of June she had 67 credit card transactions that cost her $102.
    a. Write an equation for Jillian's cost C for n number of credit card transactions.

    b. In the month of July Jillian had 42 credit card transactions. What did the credit card company charge her?

    c. In the month of August Jillian received a bill from the credit card company stating that she owed $119. How many credit card transactions did she have in August?

8. Kyle buys new car for $25,900. Every month the car decreases in value. After 6 months the car is worth $24,850. After 1 year (12 months) the car is worth $23,800.
    a. Write an equation that represents the value of Kyle's car V after m months.

    b. After how many months would the car be worth nothing?

    c. How much is the car worth 5 years later? (Remember m = months)