

Objective 64

Compare a description of a linear function to a linear function represented algebraically.

PROBLEM

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Mrs. Cobb is purchasing a new cell phone and plan. If she purchases a plan with a 2-year contract, her phone will cost \$110. There is a \$25 one-time activation fee and a monthly service charge of \$60. Mrs. Cobb can also get a plan without a contract. The total cost, C , in dollars can be represented by the function $C = 55m + 260$ for m months. This function includes a monthly service charge and the no-contract price of the same phone. Both plans include the same features. Which plan will cost more for the first 9 months of service? If both plans will cost the same, state so.

STEP 1

Determine how to solve the problem.

The problem asks which plan will cost more for the first 9 months of service. Write a function for the 2-year plan to determine the cost for 9 months of service. Use the function for the no-contract plan to determine the cost for 9 months of service. Compare the costs.

STEP 2

Write a function for the 2-year plan.

The 2-year plan costs \$110 for the phone, plus a \$25 one-time activation fee, plus a monthly service charge of \$60.

$$\begin{array}{rcccc} \underline{C} & = & \underline{110} & + & \underline{25} & + & \underline{60m} \\ \text{Cost} & & \text{Cost of phone} & & \text{Activation} & & \text{Monthly} \\ & & & & \text{fee} & & \text{service charge} \end{array}$$

The function for the 2-year plan is $C = 135 + 60m$.

STEP 3

Determine the cost for the first 9 months of service for the 2-year plan. Substitute 9 for m in the function.

$$\begin{aligned} C &= 135 + 60m \\ &= 135 + 60(9) \\ &= 135 + 540 \\ &= 675 \end{aligned}$$

The cost for the first 9 months of service is \$675.

STEP 4

Determine the cost for the first 9 months of service for the no-contract plan. Substitute 9 for m in the function $C = 55m + 260$.

$$\begin{aligned} C &= 55m + 260 \\ &= 55(9) + 260 \\ &= 495 + 260 \\ &= 755 \end{aligned}$$

The cost for the first 9 months of service for the no-contract plan is \$755.

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STEP 5

Compare the costs of the two plans.

The cost for the first 9 months of service for the 2-year plan is \$675. The cost for the first 9 months of service for the no-contract plan is \$755.

$$\$755 > \$675$$

The no-contract plan costs more for the first 9 months of service.

ANSWER

The no-contract plan will cost more for the first 9 months of service.

Guided Practice:

1. Mr. Dawar is purchasing a new cell phone and plan. If he purchases a plan with a 2-year contract, his phone will cost \$60. There is a \$15 one-time activation fee and a monthly service charge of \$65. Mr. Dawar can also get a plan without a contract. The total cost, C , in dollars can be represented by the function $C = 50m + 260$ for m months. This function includes a monthly service charge and the no-contract price of the same phone. Both plans include the same features. Which plan will cost more after 12 months of service?

[A] Mr. Dawar will have spent more on the 2-year-contract plan after 12 months.
[B] Mr. Dawar will have spent more on the no-contract plan after 12 months.
[C] Mr. Dawar will have spent the same amount on either plan after 12 months.
2. Mr. Halse is purchasing a new cell phone and plan. If he purchases a plan with a 2-year contract, his phone will cost \$80. There is a \$20 one-time activation fee and a monthly service charge of \$65. Mr. Halse can also get a plan without a contract. The total cost, C , in dollars can be represented by the function $C = 50m + 230$ for m months. This function includes a monthly service charge and the no-contract price of the same phone. Both plans include the same features. Which plan will cost more after 21 months of service? If both plans will cost the same, state so.

Independent Practice:

3. Ms. Wells is comparing the prices for renting a room at a resort versus renting a beach house. The cost in dollars of the room for n nights is represented by the function $R = 205n + 10$. This includes the nightly rate and a one-time booking fee. The beach house costs \$175 per night with a cleaning fee of \$120. If Ms. Wells stays for 2 nights, which option would be cheaper?

[A] The beach house would be cheaper for 2 nights.
[B] The room would be cheaper for 2 nights.
[C] Both options would cost the same for 2 nights.
4. Mr. Robinson is comparing the prices for renting a room at a resort versus renting a beach house. The cost in dollars of the room for n nights is represented by the function $R = 215n + 5$. This includes the nightly rate and a one-time booking fee. The beach house costs \$175 per night with a cleaning fee of \$110. If Mr. Robinson stays for 6 nights, which option would be cheaper? If both options will cost the same, state so.