EXAMPLE 5 **TAKS REASONING: Multi-Step Problem**

BMX RACING In Bicycle Moto Cross (BMX) racing, racers purchase a one year membership to a track. They also pay an entry fee for each race at that track. One racer paid a total of $125 after 5 races. A second racer paid a total of $170 after 8 races. How much does the track membership cost? What is the entry fee per race?

Solution

STEP 1 **Identify** the rate of change and starting value.

> **Rate of change, m:** entry fee per race
> **Starting value, b:** track membership cost

STEP 2 **Write** a verbal model. Then write an equation.

Total cost	=	Entry fee per race	·	Races entered	+	Membership cost
C	=	m	·	r	+	b

STEP 3 **Calculate** the rate of change. This is the entry fee per race. Use the slope formula. Racer 1 is represented by (5, 125). Racer 2 is represented by (8, 170).

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{170 - 125}{8 - 5} = \frac{45}{3} = 15$$

STEP 4 **Find** the track membership cost b. Use the data pair (5, 125) for racer 1 and the entry fee per race from Step 3.

$C = mr + b$ Write the equation from Step 2.

$125 = 15(5) + b$ Substitute 15 for m, 5 for r, and 125 for C.

$50 = b$ Solve for b.

▶ The track membership cost is $50. The entry fee per race is $15.

✓ **GUIDED PRACTICE** **for Examples 4 and 5**

4. **GYM MEMBERSHIP** A gym charges $35 per month after an initial membership fee. A member has paid a total of $250 after 6 months. Write an equation that gives the total cost of a gym membership as a function of the length of membership (in months). Find the total cost of membership after 10 months.

5. **BMX RACING** A BMX race track charges a membership fee and an entry fee per race. One racer paid a total of $76 after 3 races. Another racer paid a total of $124 after 7 races.

   a. How much does the track membership cost?

   b. What is the entry fee per race?

   c. Write an equation that gives the total cost as a function of the number of races entered.