EXAMPLE 2 ▶ Comparing Annual Fuel Cost

Assume that you drive 15,000 miles in a year. Use the information given to estimate the annual fuel cost based on a fuel price of \$2.68 per gallon for 87 octane and \$2.92 per gallon for 93 octane.

	a. 2011 Toyota Prius	b. 2011 Infiniti EX35
Miles on a Tank*	536 miles	360 miles
Tank Size	11.9 gal	20.0 gal
Recommended Octane	87	93

* Based on 45% highway and 55% city driving.

SOLUTION

a. This car can travel 536 miles on a tank of gas. To drive 15,000 miles, you need the following number of tanks.

$$\frac{15{,}000 \text{ miles}}{536 \text{ miles per tank}} \approx 27.985 \text{ tanks}$$

See page 34.

Each tank contains 11.9 gallons, so the number of gallons you use is

$$(27.985\ \cancel{\text{tanks}})\left(11.9\ \frac{\text{gallons}}{\cancel{\text{tank}}}\right) = 333.0215 \text{ gallons.}$$

At \$2.68 per gallon, your annual fuel cost is

$$(333.0215\ \cancel{\text{gallons}})\left(2.68\ \frac{\text{dollars}}{\cancel{\text{gallon}}}\right) = \$892.49762.$$

Your annual fuel cost is about \$900. In the context of the question, it is misleading to specify an annual cost of \$892.50. This would lead your reader to believe that you know more about the context than you do.

b. This car can travel 360 miles on a tank of gas. To drive 15,000 miles, you need the following number of tanks.

$$\frac{15{,}000 \text{ miles}}{360 \text{ miles per tank}} \approx 41.667 \text{ tanks}$$

See page 34.

Each tank contains 20 gallons, so the number of gallons you use is

$$(41.667\ \cancel{\text{tanks}})\left(20\ \frac{\text{gallons}}{\cancel{\text{tank}}}\right) = 833.34 \text{ gallons.}$$

At \$2.92 per gallon, your annual fuel cost is

$$(833.34\ \cancel{\text{gallons}})\left(2.92\ \frac{\text{dollars}}{\cancel{\text{gallon}}}\right) = \$2433.3528.$$

Your annual fuel cost is about \$2400 or \$2500.

Study Tip

Notice that listing the units, such as gallons per tank, helps determine the units of the answer.

The United States uses about 140 billion gallons of gasoline in a year. Many countries place high taxes on gasoline. Some people have suggested a tax of at least \$1 per gallon in the United States.

✓ Checkpoint

Help at Math.andYOU.com

How many miles per gallon does each car get?

c. A 2011 Toyota Prius **d.** A 2011 Infiniti EX35

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