

## Buying a Car

Suppose a friend tells you she paid a total of \$16,368 for a car, and you'd like to know the car's list price (the price before taxes) so that you can compare prices at various dealers. Find the list price of the car if your friend bought the car in:

- a. Arizona, where the sales tax is 6.6%.
- b. New York, where the sales tax is 8.25%.
- c. A state where the sales tax is  $r$ .



## Commentary

The emphasis in this task is not on complex solution procedures. Rather, the progression of equations, from two that involve different values of the sales tax, to one that involves the sales tax as a parameter, is designed to foster the habit of looking for regularity in solution procedures, so that students don't approach every equation as a new problem but learn to notice familiar types.

This task is adapted from *Algebra: Form and Function*, McCallum et al., Wiley 2010.

### Solution: Buying a car

- a. If  $p$  is the list price in dollars then the tax on the purchase is  $0.066p$ . The total amount paid is  $p + 0.066p$ , so

$$\begin{aligned}p + 0.066p &= 16,368 \\(1 + 0.066)p &= 16,368 \\p &= \frac{16,368}{1 + 0.066} = \$15,354.60,\end{aligned}$$

to the nearest penny.

- b. The total amount paid is  $p + 0.0825p$ , so

$$\begin{aligned}p + 0.0825p &= 16,368 \\(1 + 0.0825)p &= 16,368 \\p &= \frac{16,368}{1 + 0.0825} = \$15,120.55.\end{aligned}$$

- c. The total amount paid is  $p + rp$ , so

$$\begin{aligned}p + rp &= 16,368 \\(1 + r)p &= 16,368 \\p &= \frac{16,368}{1 + r} \text{ dollars.}\end{aligned}$$

