**STEP 1** **Write** a linear system and then write an augmented matrix.

$$2m + p = 15.5$$
$$2m + 2p + d = 37$$
$$4m + 3p + 2d = 72.5$$

$$\begin{bmatrix} 2 & 1 & 0 & | & 15.5 \\ 2 & 2 & 1 & | & 37 \\ 4 & 3 & 2 & | & 72.5 \end{bmatrix}$$

**STEP 2** **Add** $-2$ times the first row to the third row.

$$(-2)R_1 + R_3 \longrightarrow \begin{bmatrix} 2 & 1 & 0 & | & 15.5 \\ 2 & 2 & 1 & | & 37 \\ 0 & 1 & 2 & | & 41.5 \end{bmatrix}$$

**STEP 3** **Add** $-1$ times the first row to the second row.

$$(-1)R_1 + R_2 \longrightarrow \begin{bmatrix} 2 & 1 & 0 & | & 15.5 \\ 0 & 1 & 1 & | & 21.5 \\ 0 & 1 & 2 & | & 41.5 \end{bmatrix}$$

**STEP 4** **Add** $-1$ times the second row to the third row.

$$(-1)R_2 + R_3 \longrightarrow \begin{bmatrix} 2 & 1 & 0 & | & 15.5 \\ 0 & 1 & 1 & | & 21.5 \\ 0 & 0 & 1 & | & 20 \end{bmatrix}$$

**STEP 5** **Multiply** the first row by 0.5.

$$0.5R_1 \longrightarrow \begin{bmatrix} 1 & 0.5 & 0 & | & 7.75 \\ 0 & 1 & 1 & | & 21.5 \\ 0 & 0 & 1 & | & 20 \end{bmatrix}$$

The third row of the matrix tells you that $d = 20$. Substitute 20 for $d$ in the equation for the second row, $p + d = 21.5$, to obtain $p + 20 = 21.5$, or $p = 1.5$. Then substitute 1.5 for $p$ in the equation for the first row, $m + 0.5p = 7.75$, to obtain $m + 0.5(1.5) = 7.75$, or $m = 7$.

▶ A movie pass costs $7, a package of popcorn costs $1.50, and a DVD costs $20.

**PRACTICE**

1. **WHAT IF?** In the problem on page 218, suppose a basic basket costs $17.75, a medium basket costs $34.50, and a super basket costs $67.25. Use an augmented matrix to find the cost of each item.

2. **FINANCE** You have $18,000 to invest. You want an overall annual return of 8%. The expected annual returns are 10% for a stock fund, 7% for a bond fund, and 5% for a money market fund. You want to invest as much in stocks as in bonds and the money market combined. Use an augmented matrix to find how much to invest in each fund.

3. **BIRDSEED** A pet store sells 20 pounds of birdseed for $10.85. The birdseed is made from two kinds of seeds, sunflower seeds and thistle seeds. Sunflower seeds cost $.34 per pound and thistle seeds cost $.79 per pound. Use an augmented matrix to find how many pounds of each variety are in the mixture.

4. **REASONING** Solve the given system using an augmented matrix. What can you say about the system's solution(s)?

$$x - 2y + 4z = -10$$
$$5x + y - z = 24$$
$$3x - 6y + 12z = -30$$