

**Challenge: Skills and Applications**

For use with pages 308–314

In Exercises 1–4, write an equation in standard form of the line that passes through the two points.

**Example:**  $(\frac{1}{4}, \frac{3}{8}), (\frac{3}{5}, \frac{1}{2})$

|                  |  |  |
|------------------|--|--|
| <b>Solution:</b> | $y - \frac{1}{2} = \frac{5}{14}(x - \frac{3}{5})$        | Find slope and write equation in point-slope form. |
|                  | $y - \frac{1}{2} = \frac{5}{14}x - \frac{3}{14}$         | Use distributive property.                         |
|                  | $14(y - \frac{1}{2}) = 14(\frac{5}{14}x - \frac{3}{14})$ | Multiply each side by least common denominator.    |
|                  | $14y - 7 = 5x - 3$                                       | Use distributive property.                         |
|                  | $-5x + 14y = 4$  | Add $-5x$ and 7 to each side.                      |

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| 1. $(\frac{1}{2}, -\frac{2}{3}), (\frac{3}{4}, \frac{7}{8})$ | 2. $(-3, 2\frac{1}{4}), (3\frac{1}{5}, 10)$ |
| 3. $(-1, p), (2, -4)$  | 4. $(3, -2), (1, q)$                        |

In Exercises 5–7, use the following information.

Melissa Jenkins is trying to determine the composition of a 12-milligram chemical solution. She knows the solution contains two chemicals. Each milliliter of one chemical weighs 2 milligrams and each milliliter of the other weighs 3 milligrams.

- Write an equation that represents the different numbers of milliliters of each chemical that could be in the solution.
- If there are 1.8 milliliters of the first chemical, how much of the second chemical is there?
- Is it possible that the mixture contains the same number of milliliters of each chemical? If so, what is that number of milliliters?

In Exercises 8–9, Steven Chang is cutting shelves that are either 4.5 feet or 3.75 feet long. (Ignore the width of the saw blade.)

- Write an equation that represents the numbers of shelves of each length that Steven can cut if he has 24 feet of wood. How many shelves of each length can he cut with no wood left over?
- The wood is only sold in lengths of 12 feet or less. Will Steven need to piece together sections of wood to make a shelf? Explain.