

ACE Assignment Guide for Problem 4.3



Core 15–20

Other 47–50, 63, and unassigned choices from previous problems

Adapted For suggestions about adapting ACE exercises, see the *CMP Special Needs Handbook*.

Connecting to Prior Units 47: *Filling and Wrapping*; 48, 49: *Say It With Symbols*; 50: *Stretching and Shrinking*; 50: *Kaleidoscopes, Hubcaps, and Mirrors*

Answers to Problem 4.3

A. 1. Possible sequences:

Solve the first equation for y in terms of x .

$$x - 2(-2x - 1) = 12$$

$$5x + 2 = 12$$

$$x = 2$$

$$y = -2(2) - 1$$

$$y = -5$$

Solve the second equation for x in terms of y .

$$2(2y + 12) + y = -1$$

$$5y + 24 = -1$$

$$y = -5$$

$$x = 2(-5) + 12$$

$$x = 2$$

2. In this system it is probably easier to solve the first equation for y in terms of x , getting $y = -2x + 3$. The solution to the system is $x = 2$ and $y = -1$.

3. This system can be solved by substitution by solving for x in terms of y or for y in terms of x in the first equation or by solving for x in terms of y in the second equation.

The solution is $x = -\frac{10}{3}$ and $y = \frac{5}{3}$.

4. In this system it is probably easiest to solve the first equation for y in terms of x . When this relationship is substituted in the second equation, the resulting equation $6x + 2(-3x + 4) = 7$ yields $0x + 8 = 7$. No values of x satisfy this equation, so the system has an empty solution set. This puzzling result can be explained by graphing the two given equations and discovering that the graphs are parallel lines.

5. In this system one could solve either original equation for y in terms of x and then substitute in the other. Trying the first equation, one gets $y = -1.5x + 5$. The substitution in the second equation yields $-6x - 4(-1.5x + 5) = -20$. Proceeding to solve this equation in x one arrives at $0x - 20 = -20$ or simply $-20 = -20$. Since this equation is true regardless of the value of x , the equation has an infinite number of solution pairs.

This solution situation can be explained by graphing the two lines and discovering that the graphs are identical. Thus any ordered pair (x, y) that satisfies one equation will certainly satisfy the other.

This situation does not mean that any pair (x, y) will satisfy the system, only that any pair satisfying one of the equations will also satisfy the other.

6. Solve either individual equation for x in terms of y or vice versa. The solution is $x = 7.5$ and $y = 5.5$.

- B. 1.** System (4) corresponds to two parallel lines and system (5) corresponds to identical lines.

2. In $y = mx + b$ form, the systems are

$$\begin{cases} y = -3x + 4 \\ y = -3x + 3.5 \end{cases} \text{ and } \begin{cases} y = -1.5x + 5 \\ y = -1.5x + 5 \end{cases}$$

The first two lines are parallel and disjoint; the second two are identical.

- C. 1.** See discussion of solution methods in the Summarize section.

a. $\left(\frac{5}{7}, 3\frac{1}{7}\right)$

b. $\left(\frac{20}{17}, \frac{11}{17}\right)$

2. In system (a), it is easy to write each equation in $y = ax + b$ form. This makes the equivalent form method useful.

In system (b), the arithmetic becomes more tedious to use the equivalent form method. However, the first equation is easy to write in $y = ax + b$ form and then to use substitution.