

Supplemental Questions:

1. When solving a system of equations using the substitution method, you know there are _____ when, after substituting, you end up with an untrue statement such as $3x + 2 = 3x - 1$, $x = x + 5$, $3 = 7$, or $4 = 0$. In this instance, the correct set notation to use is _____.

2. When solving a system of equations using the substitution method, you know there are _____ when, after substituting, you end up with a true statement such as $3x + 2 = 3x + 2$, $x = x$, $2 = 2$, or $0 = 0$. Supposing the system of equations in question is

$$3x - 4y = 9$$

$$y = \frac{3}{4}x - \frac{9}{4}$$

the correct set notation to use is _____.

Practice Exercises:

In exercises 1 - 31, solve each system by the substitution method. If there is no solution or an infinite number of solutions, so state. Use set notation to express solution sets.

1. $x + y = 4$
 $y = 3x$

3. $x + 3y = 8$
 $y = 2x - 9$

5. $x + 3y = 5$
 $4x + 5y = 13$

7. $2x - y = -5$
 $x + 5y = 14$

11. $-3x + y = -1$
 $x - 2y = 4$

15. $y = 3x - 5$
 $21x - 35 = 7y$

19.
$$2x - y = 6$$
$$3x + 2y = 5$$

27.
$$y = \frac{1}{3}x + \frac{2}{3}$$
$$y = \frac{5}{7}x - 2$$

31.
$$2x - 3y = 8 - 2x$$
$$3x + 4y = x + 3y + 14$$

In exercises 33 and 37, write a system of equations modeling the given conditions. Then solve the system by the substitution method and find the two numbers.

33. The sum of two numbers is 81. One number is 41 more than the other. Find the numbers.

37. The difference between two numbers is 1. The sum of the larger number and twice the smaller number is 7. Find the numbers.

Applications:

41. The following models describe wages for low skilled labor.

$$p = -0.325x + 5.8 \text{ Demand Model}$$

$$p = 0.375x + 3 \text{ Supply Model}$$

Please look in the book on page 307 for more information on how these models work.

- a. Solve the system above and find the equilibrium number of workers, in millions, and the equilibrium hourly wage.
- b. Use your answer from part (a) to complete this statement:
If workers are paid _____ per hour, there will be _____ million available workers and _____ million workers will be hired.
- c. In 2007, the federal minimum wage was set at \$5.15 per hour. Substitute 5.15 for p in the demand model, $p = -0.325x + 5.8$, and determine the millions of workers employers will hire at this price.
- d. At a minimum wage of \$5.15 per hour, use the supply model, $p = 0.375x + 3$, to determine the millions of available workers. Round to one decimal place.
- e. At a minimum wage of \$5.15 per hour, use your answers from parts (c) and (d) to determine how many more people are looking for work than employers are willing to hire.