

**Practice
6-1*****What is a System of Linear Equations in Two Variables?***

1. Determine which of the following represents a system of linear equations. Check all that apply.

I $x = -9$
 $z = -9 + x$

II $17x = 36 - 24z$

III $6xz + 7$

IV $z = 7x$
 $z = 2.7x$

☐ A. I

☐ C. III

☐ B. II

☐ D. IV

2. Why isn't $4y - 5z = 3.2$ a system of linear equations?

☐ A. It is not an equation.

☐ D. The equation is not linear.

☐ B. It is only a single equation.

☐ E. It is a system of linear equations.

☐ C. There are more than two variables.

3. Is (2, 1) a solution of the following system of linear equations?

$$\begin{aligned} -2x + y &= -3 \\ x + y &= 3 \end{aligned}$$

4. Is (-2, -5) a solution of the following system of linear equations?

$$\begin{aligned} x - y &= 3 \\ 2x - y &= 1 \end{aligned}$$

5. The growth of two dogs is studied over a 10-month period. The initial weight and growth of each dog are shown in the table. Which system of equations could you use to compare the weights of the dogs? Let w represent the weight of a dog and let t represent time in months.

	Dog 1	Dog 2
Initial Weight	2 pounds	4 pounds
Rate of Growth	7 pounds per month	4.5 pounds per month

☐ A. $w = 4.5 + 7t$

☐ C. $w = 2 + 7t$

$$w = 4 + 2t$$

$$w = 4 + 4.5t$$

☐ B. $w = 7 + 4.5t$

☐ D. $w = 2 + 4.5t$

$$w = 2 + 4t$$

$$w = 4 + 7t$$

6. Carissa has 20 marbles. Enrique has 6 marbles and buys 3 more marbles each week. Which system of equations could you use to compare the number of marbles each person has? Let m represent the number of marbles. Let t represent time in weeks.

- ☐ A. $m = 20$
 $m = 3 + 6t$
- ☐ B. $m = 20$
 $m = 6$
- ☐ C. $m = 20t$
 $m = 6t$
- ☐ D. $m = 20$
 $m = 6 + 3t$

7. **Writing** You open two bank accounts. In one bank account, your initial deposit is \$560 and you deposit \$105 each month. Your initial deposit in the other bank account is \$1,160 and you deposit \$55 each month. Let d represent the total number of dollars in an account. Let t represent the time in months.

- a) Which of the following systems can you use to compare how much is in each account?

- ☐ A. $d = 560 + 55t$
 $d = 1,160 + 105t$
- ☐ B. $d = 560t + 1,160$
 $d = 105t + 55$
- ☐ C. $d = 560 + 105t$
 $d = 1,160 + 55t$
- ☐ D. $d = 560t + 105$
 $d = 1,160t + 55$

- b) How can using a system of equations be helpful in this situation?

8. a) **Reasoning** Is the following a system of linear equations?

$$z = 4x + 4y$$
$$4x = 8y + 8z$$

- ☐ A. No, because there are more than two variables.
- ☐ B. No, because only one of the equations is linear.
- ☐ C. No, because there is only one equation.
- ☐ D. No, because they are expressions.
- ☐ E. Yes, it is a system of linear equations.
- b) Does a system of linear equations always have two variables? Do you have to use the same variables in all of the equations? Explain.

- 9. Error Analysis** A company has two branches that are growing rapidly. Branch 1 opened with 16 clients and they get 4 new clients each week. Branch 2 opened with 42 clients and they get 11 new clients each week. A manager of the company wants to compare the number of clients each branch has, n , with respect to the number of weeks since the company opened, w . The manager incorrectly uses the system of equations below to compare the number of clients for each branch.

$$n = 16w + 4$$

$$n = 42w + 11$$

- a) Which system can the manager use to compare the number of clients for each branch?

- ☐ A. $n = 16 + 42$
 $n = 4w + 11w$
☐ C. $n = 16 + 11 + w$
 $n = 42 + 4 + w$
☐ B. $n = 16 + 4w$
 $n = 42 + 11w$
☐ D. $n = 16w + 11$
 $n = 42w + 4$

- b) What error might the manager have made?

- ☐ A. The manager switched the constant and coefficient of w in both equations.
☐ B. The manager combined the rates in one equation and the number of clients each branch started with in the other equation.
☐ C. The manager used the rate for Branch 1 with the number of clients Branch 2 started with and used the rate for Branch 2 with the number of clients Branch 1 started with.
☐ D. The manager multiplied by w instead of adding w .

- 10. Hydrology** Scientists observe the depth of two lakes for three months. The initial depth of the lakes and the rate of change in depth of each lake are shown in the table. Let d represent the initial depth of a lake and t represent the number of weeks.

	Lake 1	Lake 2
Initial Depth	58 feet	53 feet
Rate of Change	0 feet per week	3 feet per week

- a) Which system of equations could you use to compare the depths of the lakes over that time period?

- ☐ A. $d = -58$
 $d = 3t - 53$
☐ C. $d = 58$
 $d = 53 + 3t$
☐ B. $d = 58t$
 $d = 53t$
☐ D. $d = 0$
 $d = 3t$

- b) Which lake is deeper after 5 weeks?

- ☐ A. Lake 1 is deeper.
☐ B. Lake 2 is deeper.
☐ C. The lakes have the same depth.

- 11. Estimation** Find which of the following ordered pairs is the best solution of the given system by first rounding each of the given coordinates to the nearest integer.

$$\begin{aligned}x - 7 &= -8 \\ -x + 4y &= 20\end{aligned}$$

- ☐ A. $(-3.4, 4.6)$ ☐ B. $(-4.6, 3.4)$ ☐ C. $(-3.7, 4.3)$

- 12.** Which of the following represents a system of linear equations?

I $b = c + 24$
 $b = 2c^2 + 3c$

II $15b + 4d$
 $6.7d - c$

III $b = 7c - 24$
 $c = b - 6$

IV $b = -6c$
 $c = 9$

V $8b + 7cd = 57$
 $b = 5.4c - d$

VI $b = 0.63c$
 $b = c$

Check all that apply.

- | | |
|---------------------------------|--------------------------------|
| ☐ A. I | ☐ D. IV |
| ☐ B. II | ☐ E. V |
| ☐ C. III | ☐ F. VI |

- 13.** Which of the ordered pairs, $(6,4)$, $(6,3)$, or $(1,3)$, is a solution of the system of equations? Check all that apply.

$$\begin{aligned}-3x + 5y &= 12 \\ 7x + 4y &= 19\end{aligned}$$

- ☐ A. $(6,3)$
☐ B. $(1,3)$
☐ C. $(6,4)$
☐ D. None of the ordered pairs are solutions of the system.

14. Think About the Process

- a)** What is the first step in deciding if the ordered pair $(6, -13)$ is a solution of the given system of linear equations?

$$\begin{aligned}3x &= -34 - 4y \\ 52 &= -2y + 13x\end{aligned}$$

- ☐ A. Solve each equation for a variable.
☐ B. Replace each variable in the first equation with 6 and each variable in the second equation with -13 .
☐ C. Replace x with -13 and y with 6 in each equation.
☐ D. Replace x with 6 and y with -13 in each equation.

- b)** Is $(6, -13)$ a solution of the system?

- 15. Think About the Process** A family is renting a car for a trip. Company F charges an initial price of \$25 plus \$0.35 per mile. Company G charges an initial price of \$13 plus \$0.40 per mile.
- a) What variables do you need to write a system of equations to compare the costs to rent a car from the two companies?
- ☐ A. The initial price c and the cost per mile m
 - ☐ B. The initial price c and the number of miles driven m
 - ☐ C. The total cost to rent the car c and the number of miles driven m
 - ☐ D. The cost per mile c and the number of miles driven m
 - ☐ E. The total cost to rent the car c and the cost per mile m
- b) Which system models this situation?
- | | |
|---|---|
| ☐ A. $c = 25 + 0.35m$
$c = 13 + 0.40m$ | ☐ C. $25 = 0.35c + m$
$13 = 0.40c + m$ |
| ☐ B. $25 = c + 0.35m$
$13 = c + 0.40m$ | ☐ D. $c = 25m + 0.35$
$c = 13m + 0.40$ |

1. A, D
2. B
3. Yes
4. Yes
5. C
6. D
7. a) C
b) Answers will vary
8. a) A
b) Answers will vary
9. a) B
b) A
10. a) C
b) B
11. C
12. C, D, F
13. B
14. a) D
b) No
15. a) C
b) A