



Applications

1. A school is planning a Saturday Back-to-School Festival to raise funds for the school art and music programs. Some of the planned activities are a ring toss, frog jump, basketball free throws, and a golf putting green. The organizers are considering two pricing plans.

Plan 1: \$5 admission fee, \$1 per game

Plan 2: \$2.50 admission fee, \$1.50 per game

- a. Write equations that show how the cost y for playing the games at the festival depends on the number of games x that a participant chooses to play.
 - b. Estimate the coordinates of the intersection point of the graphs of the two equations. Check to see if those coordinates are an exact solution of both equations.
 - c. Use the expressions in the two cost equations to write and solve a single linear equation for the x -coordinate of the intersection point. Then use that x -value to find the y -coordinate of the intersection point.
 - d. For what number of games would Plan 1 be a better deal for participants than Plan 2?
2. In Exercise 1, suppose the two pricing plans changed as follows. Complete parts (a)–(d) based on these two plans.

Plan 1: \$4.50 admission fee, \$1 per game

Plan 2: \$3.50 admission fee, \$1 per game

Solve each system of equations.

3. $\begin{cases} y = 6x + 4 \\ y = 4x - 2 \end{cases}$

4. $\begin{cases} y = 3x + 7 \\ y = 5x - 7 \end{cases}$

5. $\begin{cases} y = -2x - 9 \\ y = 12x + 19 \end{cases}$

6. $\begin{cases} y = -x + 16 \\ y = -x - 8 \end{cases}$

7. $\begin{cases} y = 17x - 6 \\ y = 12x + 44 \end{cases}$

8. $\begin{cases} y = -20x + 14 \\ y = -8x - 44 \end{cases}$

For Exercises 9–14, write the equation in $y = mx + b$ form.

9. $4x + 6y + 12 = 0$

10. $-7x + 9y + 4 = 0$

11. $-4x - 2y - 6 = 0$

12. $-x + 4y = 0$

13. $2x - 2y + 2 = 0$

14. $25x + 5y - 15 = 0$

15. A sixth-grade class sells pennants and flags. They earn \$1 profit for each pennant sold and \$6 profit for each flag sold. They sell 50 items in total for a profit of \$115.

- Write two equations that represent the relationship between the number of pennants sold p and the number of flags sold f .
- How many pennants and how many flags were sold?

16. A seventh-grade class sells mouse pads and cell phone cases with their school logo on them. The class earns \$2 profit for each mouse pad sold and \$4 profit for each cell phone case sold. They sell 100 items in total for a profit of \$268.

- Write two equations that represent the relationship between the number of mouse pads sold m and the number of cell phone cases sold c .
- How many mouse pads and how many cell phone cases were sold?

17. Write a system of equations that you can use to find the two numbers.

- Two numbers have a sum of 119 and a difference of 25.
- Two numbers have a sum of 71 and a difference of 37.
- Two numbers have a sum of 32 and a difference of 60.
- Two numbers have a sum of 180 and a difference of 45.
- If you know the sum and difference of two numbers, how can you use this information to find one of the two missing numbers? How do you find the second missing number?