

## EXERCISES

- Write a simple equation that has no solutions.
- Write a simple equation that has infinitely many solutions.
- William solved the equation in the box below. How many solutions does his equation have? Explain how you know.

$2(x + 2) = 2x + 4$	
$2x + 4 = 2x + 4$	
$\frac{-2x}{-2x}$	$\frac{-2x}{-2x}$
$4 = 4$	

Solve each equation. Describe the number of solutions (one, none or infinitely many).

- |                                       |                                       |   |
|---------------------------------------|---------------------------------------|---|
| <b>4.</b> $2(x + 7) = 2x + 7$         | <b>5.</b> $5x - 3 = x + 17$           | <b>6.</b> $-3x = 4x - 49$                         |
| <b>7.</b> $10 + 6x - 3 = 2x + 7 + 4x$ | <b>8.</b> $4(x - 2) + 1 = -7$         | <b>9.</b> $\frac{1}{2}(x + 6) = \frac{1}{2}x + 3$ |
| <b>10.</b> $\frac{x}{3} + 12 = 2$     | <b>11.</b> $10x - 2 - 6x = 2(2x - 1)$ | <b>12.</b> $5x - 30 = 5x + 30$                    |
| <b>13.</b> $28 = 12 - 4x$             | <b>14.</b> $6x - 1 = 3(2x + 4) - 1$   | <b>15.</b> $4x - 0.8 = 3x - 0.8 + x$              |
- 16.** Tara and Alice joined the same movie club. Tara said her monthly fee is represented by the expression  $2x + 8$ . Alice said her monthly fee is  $2(x + 4)$ . In both expressions,  $x$  is the number of movies rented in a month. Who got the best deal? Explain how you know.



- 17.** Quinn and Logan solved the equation  $8(x - 5) = 8x + 40$ . Quinn said the answer was  $x = 0$  and Logan said there are no solutions. Who is correct? Support your answer with work.
- 18.** Nancy wrote two equivalent expressions. If she sets them equal to each other, will the equation have one solution, no solution or infinitely many solutions? Use an example to support your answer.
- 19.** Kareem wanted to write an equation for his friend to solve that would have infinitely many solutions. Help him write an equation for his friend. Explain how you know this equation fits what Kareem is looking for.
- 20.** Jared told his teacher that it is impossible to have a one-step equation (only one operation in the equation) that has no solution. Is Jared correct? Explain your reasoning.



## REVIEW

Simplify each expression.

21.  $9 + 2x - 4 + 8x$

22.  $7(x - 2) + 6(x + 1)$

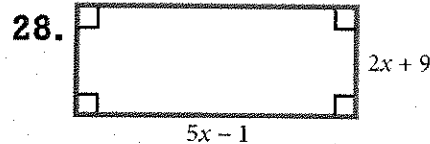
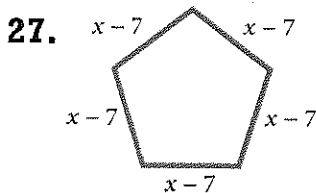
23.  $7 + 3(x - 4)$

24.  $-9x + 8x + 7y - 6y$

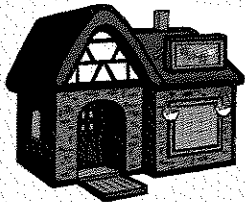
25.  $7x + 3y - x + 4y - 2x$

26.  $12y - 3x + 10x - y$

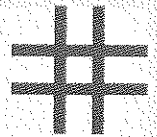
Write a simplified expression for the perimeter of each figure.



## TIC-TAC-TOE ~ SMALL BUSINESS PROFITS



When someone opens a small business, they often use linear equations to determine profits and losses. Three individuals started up three different businesses which are described below.



### Business #1

Sarah's Coffee Shop  
Start-Up Cost = \$275  
Profit per Coffee Sold = \$2.50  
Equation:  
 $P = -275 + 2.50C$

### Business #2

Jason's Skateboarding Store  
Start-Up Cost = \$400  
Profit per Board Sold = \$14

### Business #3

Jamal's Gaming Shop  
Start-Up Cost = \$750  
Profit per Game Sold = \$9.75

1. An equation representing total profits is shown for Business #1. Write the equations for the total profits for the other two businesses.
2. For each business, determine how many items they will need to sell to earn back the amount of money they spent for starting their business.
3. Each business has a goal of making a total profit of \$10,000 in the first quarter of the year. Determine how many total items they will each need to sell to reach their goal.
4. Design your own small business.
  - a. Choose one item to sell. Describe why you would like to sell this item.
  - b. Estimate the total start-up costs. Explain how you came up with this amount.
  - c. Estimate the total profit you hope to make per item sold. Explain how you came up with this amount.
  - d. Repeat #1 - #3 above for your small business idea.
  - e. Do you think there would be enough interest in your product to reach the goal of \$10,000 in the first quarter? Explain your reasoning.