

Answer Key

7.3.4 How can I find the unknown?

Writing Algebraic Equations and Inequalities



Today you will use variables to **represent specific unknown quantities**. Then you will use equations to represent real-life situations that involve unknown quantities. You will also explore how equations and inequalities can be solved to determine the values of the unknown variables.

7-112. FINDING UNKNOWN VARIABLES WITH EQUATIONS

- An airplane is at full capacity, carrying an unknown number of passengers and 7 crewmembers. What variable could you use to represent the unknown number of passengers? Write an expression for the total number of people on the plane. An expression does not have an equal sign. For example, $x - 3$ is an expression. $p + 7$
 $p = \text{total \# of Pass}$
- Equations** can be used to help you find the value of an unknown variable. Equations have expressions on both sides of an equal sign. For example, $9(2x + 7) = 228$ is an equation.
- The plane was designed to hold 241 people. Write an **equation** that equates the total number of people to your expression in part (a) above. $241 = p + 7$
- Thinking about the idea of inverse operations, determine the value that your variable needs to be in order to **solve** your equation. That is, how many passengers can fly in the plane? Write a complete sentence. 234 . There are 234 passengers on the plane.
- Whenever it flies, the airplane is not always at full capacity. Using what you wrote in part (b) as a start, write an **inequality** to relate the total number of people to the capacity of the plane. In the inequality, use the mathematical symbol for "less than or equal to" (\leq). $241 \geq p + 7$
- What values for p will make the inequality you wrote in part (d) true? That is, what are the solutions to the inequality? $241 \geq p + 7$
 -7 -7 $(234 \geq p)$

7-113. According to the attendance office, Lakeside Middle School has 57 fewer students than Xavier Middle School. You want to determine the number of students that attend Xavier Middle School.

- When you use a variable to represent an unknown, you will need to **define your variable** using a "let" statement to communicate what your variable represents. For example, in problem 7-112, you could have said, "Let p represent the number of passengers."
- Write an algebraic *expression* for the number of students at Lakeside Middle School. Make sure you define the variable you choose. $x = \text{number of students at Lakeside MS}$
 $x - 57$
- The attendance office says there are 403 students at Lakeside Middle School. Use the expression that you wrote in part (a) and write an **equation** for the number of students at Lakeside Middle School. $403 = x - 57$
- How many students are at Xavier Middle School? Explain how you used inverses to find your answer. Write your answer in a complete sentence. 460 . Undo the subtraction by adding.
- Use your equation to show how you know that 550 is not the number of students who are at Xavier Middle School. Test two other values that do not make the equation true. How many solutions are there to the equation that you wrote in part (b)?
 $403 = 550 - 57$
 $403 = 493$
not equal