Frequently Asked Questions

Q: What is the difference between an expression and an equation?

A: An expression ... An equation ...

... is like a word phrase. ... is like a word sentence.

... may contain one or ... may contain one or

more operations but does have an equal sign.

... not have an equal sign.

... can be evaluated by ... can be solved by

... substituting a number for determining the values of

... each variable and then the variables that make the

... calculating. equation true.

Examples: $3n, b + 4,$

$2p - 7$ Examples: $3n = 6,$

$b + 4 = 13, 2p - 7 = 37$

Q: How can you solve an equation?

A1: You can use mental math and reason out the solution by working backward. For example, to solve $26 = 3b + 5,$ you can reason as follows:

• Since you add 5 to $3b$ to get 26, $3b$ must be 21.

• Three times a number is 21, so the number must be 7.

• Verify your answer by substituting the value you got for the variable into the original equation. Both sides of the equation should have the same value. If not, try again.

$26 = 3b + 5$ Verify.

$21 = 3b$ Left side: $26$

$7 = b$ Right side: $3b + 5$

$= 3(7) + 5$

$= 21 + 5$

$= 26 ✔$
A2: You can illustrate each step with a model or drawing. For example, to solve \( 3n + 2 = 17 \), you can use a balance model.

\[
\begin{align*}
3n + 2 &= 17 \\
3n + 2 - 2 &= 17 - 2 \\
3n &= 15 \\
\therefore n &= 5
\end{align*}
\]

Each bag contains 5 counters.

A3: You can use a table of values and a graph. For example, to solve \( 2x + 3 = 25 \), make a table of values. The coordinates of the points are \((1, 5), (4, 11)\), and \((7, 17)\). Plot these points.

\[
\begin{array}{|c|c|c|c|}
\hline
x & 1 & 4 & 7 \\
2x + 3 & 5 & 11 & 17 \\
\hline
\end{array}
\]

Draw a line from 25 on the vertical axis. Place a ruler beside the dots. Put a dot where the ruler and the 25 line meet. Draw a line down from this point to the horizontal axis. The value on the horizontal axis is the solution. From the graph, \( x = 11 \).
Practice

Lesson 9.1
1. Write a pattern rule using an algebraic expression for the number of toothpicks in any figure in the pattern at the left.

Lesson 9.2
2. A tool rental company rents a spray painter for a flat rate of $25, plus $5 per hour.
   a) Write an expression to represent the cost to rent the spray painter for any number of hours.
   b) Determine the cost to rent the spray painter for 9 h.

Lesson 9.4
3. a) Write a pattern rule to represent the counter pattern at the left.
   b) Graph the relation that the rule represents.
   c) Determine the number of counters in figure 5 using your graph.

Lesson 9.5
4. A basketball team has to raise $900 for new uniforms. The players have raised $300 from food sales. To raise the rest, they are holding a shoot-out challenge. In all, 25 teams have signed up. How much should each team pay?
   a) Create an equation to represent this problem.
   b) Solve your equation using mental math.
   c) Check your solution. Show what you did.

Lesson 9.6
5. Solve each equation.
   a) $2x + 1 = 13$
   b) $3a + 4 = 19$
   c) $4w + 3 = 15$
   d) $c + (-3) = (-5)$
   e) $2w + 8 = 24$
   f) $3x + 10 = 25$

Lesson 9.7