



Diagnostic Activity:

Part B: Using the Distributive Property to Expand and Simplify

1. Expand each product. (“Expand” means to multiply through the brackets.)

$$\begin{aligned} \text{[a]} \quad & 3(x + 5) \\ & = 3x + 15 \end{aligned}$$

$$\begin{aligned} \text{[b]} \quad & 2(x - 7) \\ & = \end{aligned}$$

$$\begin{aligned} \text{[c]} \quad & -3(2x - 4) \\ & = \end{aligned}$$

$$\begin{aligned} \text{[d]} \quad & 5(x^2 + 3x - 6) \\ & = \end{aligned}$$

$$\begin{aligned} \text{[e]} \quad & -7(x^2 - 4x + 6) \\ & = \end{aligned}$$

2. Expand and simplify each product. Expand using “FOIL”:
multiply **FIRST** terms of brackets together, then multiply **OUTSIDE** terms together,
then **INSIDE** terms of brackets together, then **LAST** terms.
In this context, “simplify” means to get the smallest expression possible.

$$\begin{aligned} \text{[a]} \quad & (m + 4)(m + 5) \\ & = m^2 + 5m + 4m + 20 \\ & = m^2 + 9m + 20 \end{aligned}$$

$$\begin{aligned} \text{[b]} \quad & (x + 2)(x + 8) \\ & = \\ & = \end{aligned}$$

$$\begin{aligned} \text{[c]} \quad & (k + 3)(k - 7) \\ & = \\ & = \end{aligned}$$

$$\begin{aligned} \text{[d]} \quad & (x - 6)(x - 9) \\ & = \\ & = \end{aligned}$$

$$\begin{aligned} \text{[e]} \quad & (b - 4)(b + 10) \\ & = \\ & = \end{aligned}$$

$$\begin{aligned} \text{[f]} \quad & (x + 5)(x - 5) \\ & = \\ & = \end{aligned}$$

3. Square each binomial and simplify.

$$\begin{aligned} \text{[a]} \quad & (x + 4)^2 \\ & = (x + 4)(x + 4) \\ & = \\ & = \end{aligned}$$

$$\begin{aligned} \text{[b]} \quad & (a - 7)^2 \\ & = \\ & = \\ & = \end{aligned}$$



Student Instruction Sheet: Unit 1, Lesson 1

Solving Equations, Part 1

Suggested Time: 75 minutes

What's important in this lesson:

In this lesson, you will learn how to solve linear equations that do not involve brackets and fractions.

Complete the following steps:

1. Read through the lesson portion of the package on your own.
2. Complete the exercises.
3. Check your answers with the Answer Key that your teacher has.
4. Ask the teacher for help if you have any questions.
5. Complete the Assessment and Evaluation and hand it in. Ask the teacher for assistance if you are experiencing any difficulty.

Hand in the following:

1. Student Handout
2. Assessment and Evaluation

Questions for the teacher:



Student Handout: Unit 1, Lesson 1, Part 1
Solving Equations, Part 1

In each of the following examples, you will be ***solving for the unknown value***. The unknown value is represented by a letter, called a variable. Solve means find the value needed to make the equation true.

<p>1. Solve for y, the unknown.</p> $14y = 28$ $\frac{14}{14} y = \frac{28}{14}$ $y = 2$ <hr/> <p>You try: Solve for g.</p> $6g = 24$ $g =$	<p>What must you multiply 14 by, in order to get the answer 28? You might guess that the correct answer is 2, but if you can't guess, there must be another way.</p> <p>Method: Divide both sides of the equation by the numerical coefficient (the number in front of the letter). This will <i>isolate the variable</i> (leave <i>y by itself</i> on one side of the equation). ($14y \div 14 = 1y$ or just y).</p> <p>The other side of the equation computes to 2. ($28 \div 14 = 2$). The value for y of 2 makes the equation true (the left side of the equation equals the right side of the equation).</p> <p>Divide both sides by the number in front of the letter. This isolates the variable.</p> <p>The value of g that makes the equation true is the solution: 4.</p>
<p>2. Solve for the unknown.</p> $f + 8 = 23$ $f + 8 - 8 = 23 - 8$ $f = 15$ <hr/> <p>You try: Solve for h.</p> $h + 7 = 52$ $h + 7 = 52$ $h =$	<p>Method: Collect like terms, in order to isolate the variable.</p> <p>The 8 and 23 must be together (they are <i>like terms</i>). Must move 8 to the other side of the equal sign. Subtract 8 from both sides of the equation, using the balancing method. (What you do to one side, you must do to the other.)</p> <p>The f will be by itself (isolated). This is the solution.</p> <p>Collect like terms (put numbers together on one side), in order to isolate the variable.</p> <p>The value of h that makes the equation true is 45.</p>



Student Handout: Unit 1, Lesson 1, Part 1
Solving Equations, Part 1

<p>3. Solve for the unknown.</p> $2b - 8 = 12$ $2b - 8 + 8 = 12 + 8$ $2b = 20$ $\frac{2b}{2} = \frac{20}{2}$ $b = 10$ <hr/> <p>You try: Solve for k.</p> $5k = 2k + 15$ $k =$	<p>Method: Collect like terms, then isolate the variable.</p> <p>Collect like terms first, by putting all numbers on one side. Add 8 to both sides of the equation (balancing method). Simplify (get to the smallest expression possible).</p> <p>Divide both sides of the equation by the numerical coefficient, to isolate the variable.</p> <p>The value of b that makes the equation true is 10.</p> <p>To collect like terms, put all variables to one side. Did you move the 2k over to the left side of the equation by subtracting 2k from both sides?</p> <p>Isolate the variable.</p> <p>The value of k that makes the equation true is 5.</p>
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<p>4. Solve for the unknown.</p> $y + 5 - 6y = 17 - 2y$ $-5y + 5 = 17 - 2y$ $-5y + 5 - 5 = 17 - 2y - 5$ $-5y = 12 - 2y$ $-5y + 2y = 12 - 2y + 2y$ $-3y = 12$ $\frac{-3y}{-3} = \frac{12}{-3}$ $y = -4$	<p>Method: Collect like terms, then isolate the variable.</p> <p>Collect like terms on each side first. Simplify each side of the equation first.</p> <p>Then move all variables to the left side and all numbers to the right side of the equal sign. Subtract 5 from both sides of the equation and add 2y to both sides of the equation.</p> <p>Even if the numerical coefficient is a negative number, divide both sides by it. This will isolate the variable.</p> <p>The value of y that makes the equation true is -4.</p>
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Assessment and Evaluation: Unit 1, Lesson 1, Part 1

For each question below, solve for the unknown value.

1. $3x = 27$

2. $c + 11 = -14$

3. $2m - 7 = m + 54$

4. $4m - 7 = 25$

5. $5x + 9 = 4x - 13$

6. $6b + 3 = 3b - 12$

7. $3a + 8 + 2a = a - 9 + 1$

8. $2g + 7 + 4 = g - 6 + 4g - 1$



Student Instruction Sheet: Unit 1, Lesson 1

Solving Equations, Part 2

Suggested Time: 75 minutes

What's important in this lesson:

In this lesson, you will learn how to solve more complex equations involving brackets and fractions.

Complete the following steps:

1. Read through the lesson portion of the package on your own.
2. After reading the examples, complete the exercises.
3. Check your answers with the Answer Key that your teacher has.
4. Ask the teacher for help if you have any questions.
5. Complete the Assessment and Evaluation, and hand it in. Ask the teacher for assistance if you are experiencing any difficulty.

Hand in the following:

1. Student Handout
2. Assessment and Evaluation sheet

Questions for the teacher:



Student Handout: Unit 1, Lesson 1, Part 2

In each of the following examples, you will be solving for the unknown value. The unknown value is represented by the variable in each equation.

Examples:

1. Solve for the unknown value.

$$2(d - 7) = 6$$

Use the distributive property.
Multiply each term in the bracket by the number in front of the bracket.

$$2d - 14 = 6$$

$$2d - 14 + 14 = 6 + 14$$

Collect all like terms.

$$2d = 20$$

$$\frac{2d}{2} = \frac{20}{2}$$

Divide both sides of the equation by the numerical coefficient to isolate the variable.

$$d = 10$$

The value of d that makes the equation true is 10.

2. Solve for the unknown value. Use the distributive property, collect like terms, and isolate the variable.

$$3(n + 1) + 11 = 9 - 2n$$

Multiply all terms in the brackets by 3.

$$3n + 3 + 11 = 9 - 2n$$

Do you remember what should happen next?

Are you collecting like terms?

Are you isolating the variable?

$$n =$$

The value of n that makes the equation true is -1.



Student Handout: Unit 1, Lesson 1, Part 2

3. $\frac{5x}{6} = 20$

You must first get rid of the fraction.

Isolate the variable by doing the opposite operation. For example, in this case, you would multiply both sides of the equation with what is in the denominator.

$$\frac{5x}{6} \times 6 = 20 \times 6$$

Simplify both sides of the equation.

$$\frac{30x}{6} = 120$$

$$5x = 120$$

Do you remember the next step?

Divide both sides of the equation by 5.

$$x = 24$$

4. $\frac{y}{2} + 5 = -2$

Collect like terms first.

$$\frac{y}{2} + 5 - 5 = -2 - 5$$

$$\frac{y}{2} = -7$$

$$\frac{y}{2} \times 2 = -7 \times 2$$

Multiply both sides by the denominator to get rid of the fraction.

$$\frac{2y}{2} = \underline{-14}$$

What's next?

$$y =$$



Student Handout: Unit 1, Lesson 1, Part 2

$$5. \quad 3 + b = \frac{1}{2}(1 + b)$$

Expand $\frac{1}{2}$ into the brackets first.

$$3 + b = \frac{1}{2} + \frac{1}{2}b$$

Multiply every term by the denominator.

$$(3 \times 2) + (b \times 2) = \left(\frac{1}{2} \times 2\right) + \left(\frac{1}{2}b \times 2\right)$$

$$6 + 2b = \frac{2}{2} + \frac{2}{2}b$$

Simplify all fractions.

$$6 + 2b = 1 + 1b$$

Try to finish it on your own. Collect like terms.

$$b =$$

The solution is -5.



**Assessment and Evaluation: Unit 1, Lesson 1,
Part 2**

For each question below, solve for the unknown.

1. $2(x - 3) = 3x + 7$

2. $-8a + 2 = -2(a + 5)$

3. $-2(h - 3) = -h + 3(h + 6)$

4. $\frac{1y}{3} = 4$

5. $\frac{-2y}{5} = 4$

6. $\frac{2y}{3} + 3 = 1$



Assessment and Evaluation: Unit 1, Lesson 1,
Part 2

$$7. \frac{1g}{2} - 4 = 6$$

$$8. \frac{1x}{4} + 2 = x - 3$$

$$9. x + 3 = \frac{1}{2}(x - 2)$$

$$10. \frac{2}{3}(2x - 1) = 2 - 2x$$