

7

# Lesson Exemplar for Mathematics

Quarter 4

Lesson

3

**Lesson Exemplar for Mathematics Grade 7**  
**Quarter 4: Lesson 3 (Week 3)**  
**SY 2024-2025**

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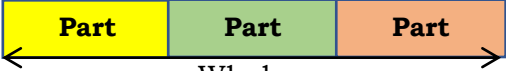
I. CURRICULUM CONTENT, STANDARDS, AND LESSON COMPETENCIES	
<b>A. Content Standards</b>	The learners should have knowledge and understanding of the solution of simple equations.
<b>B. Performance Standards</b>	By the end of the quarter, the learners are able to solve simple equations.
<b>C. Learning Competencies and Objectives</b>	<p><b>Learning Competency</b>  <b>The learners...</b></p> <ol style="list-style-type: none"> <li>1. solve simple equations represented by bar models to find unknowns;</li> <li>2. illustrate the properties of equality; and</li> </ol>
<b>D. Content</b>	<p><b>Algebraic Equation (Week 3)</b></p> <ol style="list-style-type: none"> <li>2.1 Modeling Simple Equation using Bar Models</li> <li>2.2 Solving Equations by Applying Properties of Equality</li> </ol>
<b>E. Integration</b>	Concepts on empathy, fairness, cooperation, justice and equity

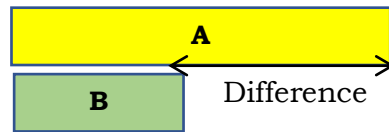
II. LEARNING RESOURCES
<p>CueMath. (2024, January 15). <i>Properties of equality</i>. Cuemath. <a href="https://www.cuemath.com/algebra/properties-of-equality/">https://www.cuemath.com/algebra/properties-of-equality/</a></p> <p>National Repository of Online Courses (2023, December 17). <i>Solving one-step equations using properties of equality</i>. LibreTexts Mathematics. <a href="https://math.libretexts.org/Bookshelves/Applied_Mathematics/Developmental_Math_(NROC)/10%3ASolving_Equations_and_Inequalities/10.01%3ASolving_Equations/10.1.01%3ASolving_One-Step_Equations_Using_Properties_of_Equality">https://math.libretexts.org/Bookshelves/Applied_Mathematics/Developmental_Math_(NROC)/10%3ASolving_Equations_and_Inequalities/10.01%3ASolving_Equations/10.1.01%3ASolving_One-Step_Equations_Using_Properties_of_Equality</a></p> <p>Orines, F. B., et al. (2012). <i>Next century mathematics 7</i>. Quezon City, Philippines</p> <p>Oronce, O. A., &amp; Mendoza, M. O. (2010). <i>E-math: Worktext in mathematics</i>. Manila, Philippines</p>

III. TEACHING AND LEARNING PROCEDURE	NOTES TO TEACHERS
<p><b>A. Activating Prior Knowledge</b></p> <p><b>DAY 1</b></p> <p><b>1. Short Review</b></p> <p>A. Translate the following verbal phrases to algebraic expressions.</p>	<p>This section of the review focuses on translating verbal phrases to algebraic expressions. The learners will match each verbal expression</p>

	<div><div><div>Column A</div><div><div>1. The sum of a number and seven</div><div>2. Three times a certain number decreased by two</div><div>3. Two subtracted from five times a number</div><div>4. A certain number decreased by two</div><div>5. Four increased by a certain number</div><div>6. A certain number decreased by five</div><div>7. Seven subtracted from a number</div><div>8. A number added to six</div><div>9. The sum of eight and a number</div><div>10.The difference of two and a number</div></div><div><div>B. Perform the indicated operations on integers. How many can you do orally?</div><div><div><div>1) <math>39 + (-46)</math></div><div>2) <math>65 - (-38)</math></div><div>3) <math>-54 + (-36)</math></div><div>4) <math>32(-25)</math></div><div>5) <math>225/(-25)</math></div></div><div><div>6) <math>2(-5 + 13)</math></div><div>7) <math>24 - (-32)</math></div><div>8) <math>12(-24)</math></div><div>9) <math>-92 - (-84)</math></div><div>10) <math>-169/13</math></div></div></div></div><div><div>1. Feedback (Optional)</div><div><div>1. What is the impact of the activity to the learners?</div><div>2. How did the learners comprehend the previous lesson?</div><div>3. Where the student was able to answer the activity easily?</div></div></div></div></div>	<div><div>Column B</div><div><div>A. <math>x - 7</math></div><div>B. <math>x - 5</math></div><div>C. <math>4 + x</math></div><div>D. <math>8 + x</math></div><div>E. <math>x + 6</math></div><div>F. <math>x - 2</math></div><div>G. <math>2 - x</math></div><div>H. <math>5x - 2</math></div><div>I. <math>3x - 2</math></div><div>J. <math>x + 7</math></div></div></div> <div><div>to a corresponding algebraic expression. It can be performed individually or in pairs.</div><div><div>For individual-based activity:</div><div>A learner will choose the correct answer from the available strips of paper</div></div><div><div>For pair-based activity:</div><div>The teacher will give each learner a strip of paper consisting of either a verbal phrase or an algebraic expression. The learners will roam around the room to find their partner having the corresponding strip of paper.</div></div><div><div>The teacher will provide a review of the operations of integers that will be answered orally by the students. Teachers can think of other activities that will set the mood of the learners.</div></div><div><div>The teacher may ask questions to check how they fully understand the previous lesson. The teacher may add other questions that he/she thinks will bring out answers to the learners on identifying the level of their understanding of the previous lesson.</div></div></div>
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		<b>Answer:</b> <b>A.</b> 1. J                      6. B 2. I                      7. A 3. H                      8. E 4. F                      9. D 5. C                      10. G  <b>B.</b> 1. -7                      6. 16 2. 103                      7. 56 3. -90                      8. -288 4. -800                      9. -8 5. -9                      10. -13
<b>B. Establishing Lesson Purpose</b>	<p><b>1. Lesson Purpose</b></p> <p>Alexa was taught by her father how to cook cupcakes. She shared her knowledge with her friends and helped them in making one. To help one of their friends fund her school project, they prepared cupcakes to be sold during the school fair. During the school fair, Julia sold twice as many cupcakes as her friend Thea. Alexa sold three times as many cupcakes as Thea. Alexa sold 78 cupcakes. How many cupcakes has Thea been able to sell? How do learners feel when they share their knowledge with others? How will they show their help to others?</p> <p>There are many ways to solve math problems, like how we can share our knowledge and help those who are in need. Translating verbal phrases to algebraic equations is a tool that will help understand how to use the different methods in solving unknown values in an algebraic equation. One way of solving the problem that involves algebraic equations is through the use of a bar model.</p> <p><b>2. Unlocking Content Vocabulary</b></p> <ol style="list-style-type: none"> <li>1. <i>Algebraic Expression</i> – an expression that is made up of variables and constants along with algebraic operations (addition, subtraction, multiplication, and division).</li> <li>2. <i>Algebraic Equation</i> – a mathematical statement in which two expressions are set equal.</li> </ol>	<p>In this part, the teacher will introduce the lesson and its application in daily life.</p> <p>The teacher may add other terms which may be used or will arise during the discussion.</p>

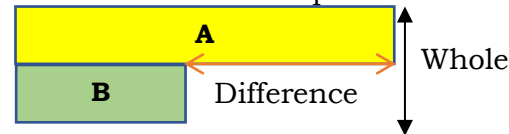
	<p>3. <i>Bar model</i> – a tool that helps us visualize the given math problem using rectangles or bars.</p> <p>4. <i>Variable</i> – a letter or symbol that represents an unknown number.</p> <p>5. <i>Equation</i> – a mathematical statement that two expressions are equal.</p> <p>6. <i>Expressions</i> - are made up of terms and the number of terms in each expression in an equation may vary.</p>	
<b>C. Developing and Deepening Understanding</b>	<p><b>SUB-TOPIC 1: Modeling Simple Equation using Bar Models</b></p> <p><b>1. Explicitation</b></p> <p>Let us say that you want to help with the daily expenses of your family. You were able to collect 68 photo cards that you want to trade. Your friend, Andrea, has seven times as many photo cards as yours. Andrea wants to share her photo cards equally between herself and you so that you can have many photo cards to be sold. How many cards do you have now? What do you think is the best way to solve the problem?</p> <p>Math problems can be visualized through bar modeling to represent known and unknown data. Bar models are one such tool that helps us visualize a given math problem using rectangles or bars. It is not a technique of computation, but rather a diagram that helps visualize the problem. A bar model is a way of using <b>rectangles</b> to represent numbers and <b>operations</b> in math problems. It can help you <b>visualize</b> the relationships between numbers and find the <b>unknown</b> values.</p> <p>Solving problems with bar modelling:</p> <p>A. Part-Part-Whole</p> <div style="text-align: center;">  <p>Whole</p> <p>Whole = Part + Part</p> <p>Part = Whole – Part</p> </div> <p>B. Equal Parts of a Whole</p> <div style="text-align: center;">  <p>Whole</p> <p>Whole = Part x Number of Parts</p> <p>Part = Whole ÷ Number of Parts</p> <p>Number of Parts = Whole ÷ Part</p> </div> <p>C. Comparison</p>	<p>The teacher can expound the daily life application through other situations encountered by the learners in their daily lives.</p> <p>To introduce the lesson, provide a statement that will guide the learners to understand why they need to learn the concept.</p> <p>The teacher can give more examples to address the needs of other learners.</p> <p>The teacher should prepare strips of paper in the shape of a rectangle so that they can show their learners how to do the bar method.</p> <p>The students may visualize what is the essence of using the bar method.</p>



$$\text{Difference} = A - B$$

$$A = B + \text{Difference}$$

#### D. Part-Part-Whole and Comparison



$$\text{Whole} = A + B$$

$$\text{Difference} = A - B$$

To further understand the illustration, here are some examples.

Discuss thoroughly the differences of each bar modeling so the learners will be able to understand when to add, subtract, multiply, and divide.

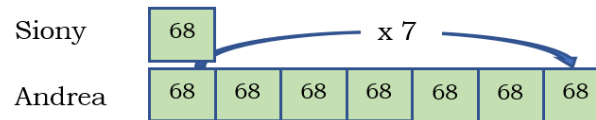
## 2. Worked Example

Example No. 1

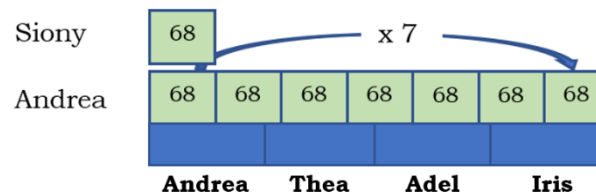
Siony was able to collect 68 photo cards which she can trade. Andrea has seven times as many cards as Siony. Andrea shares her cards equally between herself and her friends Thea, Adel, and Iris. How many cards do Andrea and Siony have now?

Solution:

A. Set up the bar model and label it carefully with the information given.



B. Make sure you have included all the information given in the problem.



C. Decide what the unknown is and how this can be calculated.

- Since Siony has 68 photo cards, multiply 68 by 7 to get the number of photo cards Andrea has.  
 $68(7) = 476$
- Andrea has 476 photo cards at the start.
- Divide 476 by 4, since it is divided equally to Andrea, Thea, Adel, and Iris.  
 $476 \div 4 = 119$  photo cards.
- Since Siony had 68 photocards before Andrea shared her photocards, then she has 187 photocards now.  
 $68 + 119 = 187$  photocards

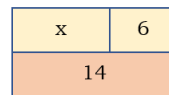
D. Complete the calculations to work out the answer to the problem.

- Andrea has 119 photo cards after sharing them with her friends.
- Siony has 187 photocards after Andrea shared her photo cards.

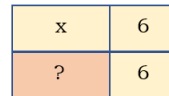
Example No. 2

Use the bar model to solve the given algebraic equation.

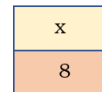
1.  $x + 6 = 14$



Draw the bar model.



Subtract 6 from both sides.  
 $x + 6 - 6 = 14 - 6$

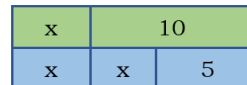


$$x + 0 = 8$$

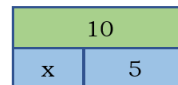
$$\mathbf{x = 8}$$

3.  $x + 10 = 2x + 5$

Draw the bar model.



Subtract x on both sides.  
 $x - x + 10 = 2x - x + 5$   
 $0 + 10 = x + 5$

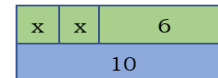


Subtract 5 on both sides.  
 $10 - 5 = x + 5 - 5$   
 $\mathbf{5 = x}$



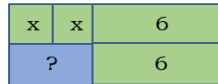
2.  $2x + 6 = 10$

Draw the bar model.



$$2x + 6 = 10$$

Subtract 6 on both sides.



$$2x + 6 - 6 = 10 - 6$$

$$2x = 4$$

Divide 2 on both sides.



$$\frac{2x}{2} = \frac{4}{2}$$

$$\mathbf{x = 2}$$

Checking:

$$x + 6 = 14$$

Substitute the value of x

$$x = 8$$

$$8 + 6 = 14$$

$$14 = 14$$

True

Checking:

$$2x + 6 = 10$$

Substitute the value of x

$$x = 2$$

$$2(2) + 6 = 10$$

$$4 + 6 = 10$$

$$10 = 10$$

True

Checking:

$$x + 10 = 2x + 5$$

Substitute the value of x

$$x = 5$$

$$x + 10 = 2x + 5$$

$$5 + 10 = 2(5) + 5$$

$$15 = 10 + 5$$

$$15 = 15$$

True



## DAY 2

### Short Review

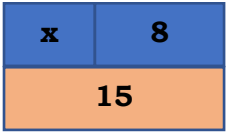
**Fact or Bluff.** Write Fact if the statement is true and Bluff if the statement is false.

1. An algebraic expression is an expression that is made up of variables and constants along with algebraic operations (addition, subtraction, multiplication, and division).
2. The mathematical statement in which two expressions are set equal is an integer.
3. The pie model is a tool that helps us visualize the given math problem using rectangles or bars.
4. A variable is a letter or symbol that represents an unknown number.
5. Expressions are made up of terms and the number of terms in each expression in an equation.

### 3. Lesson Activity

#### A. It's Bar Time

Complete the table below finding the value of the unknown using bar method.

Equation	Bar Method	Value of the Unknown
$x + 8 = 15$		$x = 7$
1. $5 + x = 10$		
2. $2x + 10 = 30$		
3. $2x - 5 = 13$		
4. $2x + 12 = 28$		
5. $3x - 4 = 2x + 5$		

This short review is all terms related to their previous lesson in which the learners should fully understand the meaning of each terms which are needed in the other lessons they will have.

The teacher may ask the learners to have the activity thumbs up or thumbs down to answer the Fact or Bluff.

#### A. It's Bar Time

1.  $x = 5$
2.  $x = 10$
3.  $x = 9$
4.  $x = 8$
5.  $x = 9$

#### B. Let's Try

1. Eight children are buying the ticket.
2. Jess has 16 T-shirts in all.

### B. Let's Try

Solve the given algebraic equation by using the bar method.

1. If the entrance fee ticket in a park costs 15 pesos each, how many children buy the ticket if they pay 120 pesos?
2. Jess has 4 black T-shirts. She has 3 times as many white as black t-shirts. How many T-shirts does she have in all?

## DAY 3

### SUB-TOPIC 2: Solving Equations by Applying Properties of Equality

#### 1. Explicitation

Translating, writing, and solving equations is an important component of mathematics. Algebraic equations help teachers and learners in solving problems in which quantities are unknown. A significant thing to remember in algebraic equations is that you can add or subtract the same quantity to both sides of an equation to maintain an equivalent equation. It is like a balance scale in our justice system wherein court judges are expected to weigh both sides of evidence, to practice fairness, and to ensure that justice is served.



Image Source: [10.1.1: Solving One-Step Equations Using Properties of Equality - Mathematics LibreTexts](#)

To solve equations algebraically, use the properties of equality. The objective is to make the equation true to the possible value of the variable. When the equation involves addition or subtraction, use the inverse operation to separate the variable.

#### Properties of Equality:

- **Reflexive Property of Equality**

For each real number  $a$ ,  $a = a$

Example:  $a + b = a + b$ ,  $-x = -x$

- **Symmetric Property of Equality**

For any real numbers  $a$  and  $b$ ,  
if  $a = b$  then  $b = a$   
Example:  $x - 5 = 3$ , then  $3 = x - 5$ .

- **Transitive Property of Equality**

For any real numbers  $a$ ,  $b$ , and  $c$   
If  $a = b$  and  $b = c$ , then  $a = c$   
Example:  $x = y$ ,  $y = z$ , then  $x = z$ .

- **Substitution Property of Equality**

For any real numbers  $a$  and  $b$ , if  $a = b$ , then  $a$  may be replaced by  $b$ , or  $b$  may be replaced by  $a$ , in any mathematical sentence without changing its meaning.  
Example: If  $x + y = 3$  and  $x = 2$ , then  $2 + y = 3$ .

## 2. Worked Example

For each of the procedures, identify the property of equality applied in the final step and state why it was used.

1.  $8 = 2x$

$4 = x$  Divide both sides by 2

$x = 4$

Answer: Symmetric Property is being used to write the final equation with the variable on the left.

2.  $C(x) = 3(x - 5)$

$= 3(x) - 3(5)$  Distributive Property

$= 3x - 15$

Answer: The transitive property is being used to relate the final expression.

3. Check if  $x = 7$  is a solution for  $2x - 6 = 8$

$2x - 6 = 8$

$2(7) - 6 = 8$  Substitution Property

$14 - 6 = 8$

$8 = 8$

Answer: The reflexive property is being used to conclude that  $8 = 8$  is a true statement.

<b>D. Making Generalizations</b>	<p><b>1. Learners' Takeaways</b></p> <ol style="list-style-type: none"> <li>1. Is the use of the bar model approach helpful in solving algebraic equations?</li> <li>2. Are all properties of equality useful in performing problem-solving?</li> </ol> <p><b>2. Reflection on Learning</b></p> <p>Let the student prepare their reflection journal. Let them reflect on their experience using the bar method in analyzing the equation and finding the unknown value of the variable. Talk about the essence: why do they always need to check the value of the unknown that they have solved? What is the application of solving equations involving algebraic formulas and properties of equality? How can they apply it in their daily life?</p>	<p>Another option: Check the learner takeaways by giving them questions that they will reflect on. This is to check whether they fully understand the lesson.</p> <p>The teacher can give additional exercises or activities they will work in groups or pairs.</p>
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IV. EVALUATING LEARNING: FORMATIVE ASSESSMENT AND TEACHER'S REFLECTION		NOTES TO TEACHERS																		
<b>A. Evaluating Learning</b>	<p><b>DAY 4</b></p> <p><b>1. Formative Assessment</b></p> <p>Use the bar method to find the value of the unknown variables.</p> <table border="1" data-bbox="533 762 1588 1141"> <thead> <tr> <th>Equation</th><th>Bar method</th><th>Value of the Unknown</th></tr> </thead> <tbody> <tr> <td>1. <math>2x + 4 = 6</math></td><td></td><td></td></tr> <tr> <td>2. <math>3a - 5 = 25</math></td><td></td><td></td></tr> <tr> <td>3. <math>x - 4 = 9</math></td><td></td><td></td></tr> <tr> <td>4. <math>2a + 5 = a + 12</math></td><td></td><td></td></tr> <tr> <td>5. <math>3b + 7 = x + 13</math></td><td></td><td></td></tr> </tbody> </table> <p><b>2. Homework (Optional)</b></p> <p>Complete each statement.</p> <ol style="list-style-type: none"> <li>1. If <math>c + 12 = 15</math>, then <math>c + 9 = \underline{\hspace{2cm}}</math></li> <li>2. If <math>9 = b + 3</math>, then <math>\underline{\hspace{2cm}} = b - 15</math></li> </ol>	Equation	Bar method	Value of the Unknown	1. $2x + 4 = 6$			2. $3a - 5 = 25$			3. $x - 4 = 9$			4. $2a + 5 = a + 12$			5. $3b + 7 = x + 13$			
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4. $2a + 5 = a + 12$																				
5. $3b + 7 = x + 13$																				

	<p>3. What is wrong in the given equation? Explain then make necessary corrections.</p> $2b - 5 = b + 12$ $2b - b - 5 + 5 = 12 - 5$ $b - 0 = 7$ $b = 7$			
<b>B. Teacher's Remarks</b>	<i>Note observations on any of the following areas:</i>	<b>Effective Practices</b>	<b>Problems Encountered</b>	<p>The teacher may take note of some observations related to the effective practices and problems encountered after utilizing the different strategies, materials used, learner engagement, and other related stuff.</p> <p>Teachers may also suggest ways to improve the different activities explored/lesson exemplar.</p>
	<b>strategies explored</b>			
	<b>materials used</b>			
	<b>learner engagement/interaction</b>			
	<b>others</b>			
<b>C. Teacher's Reflection</b>	<p><i>Reflection guide or prompt can be on:</i></p> <ul style="list-style-type: none"> <li><u>principles behind the teaching</u> <i>What principles and beliefs informed my lesson?</i> <i>Why did I teach the lesson the way I did?</i></li> <li><u>students</u> <i>What roles did my students play in my lesson?</i> <i>What did my students learn? How did they learn?</i></li> <li><u>ways forward</u> <i>What could I have done differently?</i> <i>What can I explore in the next lesson?</i></li> </ul>			<p>Teacher's reflection in every lesson conducted/facilitated is essential and necessary to improve practice. You may also consider this as an input for the LAC/Collab sessions.</p>