

**Math: Grade 6, Lesson 4, Determine if an Equation or Inequality is True**

**Lesson Focus:** Determine if an equation or inequality is true when given a set of values

**Practice Focus:** Students learn the definition of solution in the context of placing a value into a variable to see if that value makes the equations or inequalities true.

**Objective:** Students will use given sets of numbers to determine if the numbers makes the equations or inequalities true.

**Key Vocabulary:** equation, inequality, solution, set

**TN Standard:** 6.EE.B.5

**Teacher Materials:**

- dry erase board and markers

**Student Materials:**

- Paper and pencil
- Calculator is allowed, but not required

Teacher Do	Student Do
<p><b>Opening (1 minute)</b></p> <p>Hello! Welcome to Tennessee's At Home Learning Series for math! Today's lesson is for all our 6<sup>th</sup> graders out there, though all children are welcome to tune in. This lesson is the 4th in our series.</p> <p>My name is ____ and I'm a ____ grade teacher in Tennessee schools! I'm so excited to be your teacher for this lesson! Welcome to my virtual classroom!</p> <p>If you didn't see our previous lesson, you can find it on <a href="http://www.tn.gov/education">http://www.tn.gov/education</a>. You can still tune in to today's lesson if you haven't see any of our others. But, it might be more fun if you first go back and watch our other lessons since we'll be talking about things we learned previously.</p> <p>Today we will be learning about using a given set of numbers to determine what numbers will make an equation or inequality true in mathematics! Before we get started, to participate fully in our lesson today, you will need:</p> <ul style="list-style-type: none"><li>• Pencil and paper</li><li>• Calculator is allowed, but not required</li></ul> <p>Ok, let's begin!</p>	

<p><b>Intro (5 minutes)</b></p> <p><b>Today we are going to use given sets of numbers</b> [Some of them will be whole numbers, others will be fractions, we may even have decimals, since 6<sup>th</sup> graders work will all of these types of numbers.] <b>to find out if ANY of them make our equation or inequality true. This may be a review for you, so I can't wait for your help. Let's start out with remembering a few things about equations and inequalities. Oh, and you can pull out a calculator, if you would like!</b></p> <p><b>I will need your help in answering a few questions and finding a few solutions! First of all, how do we know if we have an equation?</b> [Pause] <b>If you said it has an equal sign, pat yourself on the back!</b></p> <p><b>How do we know if it is an inequality?</b> [Pause] <b>You may have said it has less than or greater than. We use the following symbols to represent our inequalities:</b> <b>&lt;, &gt;, ≤, ≥</b> [as you are writing these symbols on the board, remind students how each is read]</p> <p><b>Let's see what we remember! Get some paper and your pencil ready.</b></p> <p><b>Let me know if each is True or False:</b> [Pause and allow students time to work before reviewing the answers.]</p> <ol style="list-style-type: none"> <li><b>1.) <math>5^2 + 9 = 19</math> (False)</b></li> <li><b>2.) <math>24 - 16 &lt; 10</math> (True)</b></li> <li><b>3.) <math>2 \times (3 + 4^2) = 38</math> (True)</b></li> <li><b>4.) <math>3^3 \geq 29</math> (False)</b></li> </ol>	<p>Students respond</p>
<p><b>Teacher Model (10 minutes)</b></p> <p><b>Today, we will see variables in our equations and inequalities. What is a variable?</b> [Pause to allow students to respond]</p> <p><b>A variable is a symbol (such as a letter, you got it!) that represents a number (It's like a placeholder for a number).</b></p>	<p>Students respond</p>

We are going to have a set of numbers for each of our problems today. We are going to determine if any (or all) of the numbers make our equations or inequalities true. Are you ready? [Pause]

**Example 1:**

Each of the following numbers, if substituted for the variable, makes one of the equations below into a true number sentence. Match the number to that equation: 3, 6, 15, 16, 44

1.)  $x + 26 = 32$

2.)  $m - 12 = 32$

3.)  $4^2 = y$

4.)  $\frac{N}{4} = 11$

[Teacher talks through each one showing student the substitution of each number and labels each substitution as true or false. For example:

1.)  $3 + 26 = ? 32$  False

2.)  $6 + 26 = ? 32$  True

3.)  $15 + 26 = ? 32$  False

4.)  $16 + 26 = ? 32$  False

5.)  $44 + 26 = ? 32$  False]

**Answers:**

1.) 6

2.) 44

3.) 16

4.) 44

**Example 2:**

Let's now try the same list with the following inequalities: 3, 6, 15, 16, 44

1.)  $h + 8 > 30$

2.)  $2x < 15$

3.)  $42 \leq 50 - a$

4.)  $\frac{30}{N} > 2$

[Teacher talks through each number and labels each substitution as true or false. For example:

1.)  $3 + 8 > ? 30$  False

2.)  $6 + 8 > ? 30$  False

3.)  $15 + 8 > ? 30$  False

4.)  $16 + 8 > ? 30$  False

5.)  $44 + 8 > ? 30$  True]

<p><b>Answers:</b></p> <ol style="list-style-type: none"> <li>1.) 44</li> <li>2.) 3</li> <li>3.) 3,6</li> <li>4.) 3,6</li> </ol>	
<p><b><u>Guided Practice (10 minutes)</u></b></p> <p><b>Substitute the numbers in the set for the variable and determine which values make the equation or inequality true. Explain how you know your answer is correct.</b> [Pause to allow students to work. Encourage students to substitute each value into the given equation or inequality to provide evidence that it is or is not a solution. Talk through the 3 problems to allow students to check their work.]</p> <ol style="list-style-type: none"> <li>1.) <math>x &lt; -4</math>, given <math>\{0, -\frac{1}{2}, 5, -6, 2\frac{1}{3}, 4, -10\}</math> Solution: -6 and -10, Numbers to the left of -4 on the number line are less than -4</li> <li>2.) <math>\frac{2}{3}m = 4</math>, given <math>\{0, 2, 6, 9\}</math> Solution: 6 since <math>\frac{2}{3} \times 6 = (2 \times 6) \times \frac{1}{3} = 12 \times \frac{1}{3} = 12/3 = 4</math>, so both sides of the equation equal 4</li> <li>3.) <math>5t = 24</math>, given <math>\{4.8, \frac{24}{5}, 4\frac{4}{5}\}</math> Solution: all 3 answers satisfy the equation since <math>5 \times 4.8 = 24</math>. <math>\frac{24}{5}</math> and <math>4\frac{4}{5}</math> are equivalent to 4.8, so all the numbers in the set make the equation true.</li> </ol>	<p>Student works alongside teacher</p>
<p><b><u>Independent Practice</u></b></p> <p><b>Great work! Today, we reviewed ways to determine if equations or inequalities were true with given sets. I hope you're seeing the way substitution can be used to help determine if solutions are true! You sure did a great job! After the video, you will have some problems to practice on your own. Good luck and do your best!</b></p>	
<p><b><u>Closing (1 min)</u></b></p> <ul style="list-style-type: none"> <li>• Boys and Girls, I enjoyed learning about equations and inequalities with you today! Thank you for inviting me into your home. I look forward to seeing you</li> </ul>	

## PBS Lesson Series

<p><b>in our next lesson in Tennessee's At Home Learning Series!</b></p> <ul style="list-style-type: none"><li>• <b>Bye!</b></li></ul>	
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