

**LEARNING OBJECTIVE:** We will write equations using symbols to represent numbers. (G8M4L1)

**CONCEPT DEVELOPMENT:**

**Equation:** An equation is a statement of equality between two expressions.

Examples:

3 + 4 = 7  
 "is"

SENTENCE

$\tan \theta = \frac{\sin \theta}{\cos \theta}$

PHRASE OR CLAUSE

$\frac{1}{2}x + 15 = x$

**Writing Equations (words v. symbols)**

- Define your variables. "Let x equal ..."
- Written mathematical statements can be represented as more than one correct symbolic statement.
- Break complicated problems into smaller parts.

Example: 'x' has the property that when the square of half of x is subtracted from five times x, we get back x itself.

Let x equal the whole number equal

$5x - (\frac{1}{2}x)^2 = x$

Addition	Subtraction	Multiplication	Division	Other words
<ul style="list-style-type: none"> <li>• More than</li> <li>• Plus</li> <li>• Sum</li> <li>• Added to</li> <li>• Deposit</li> <li>• And</li> <li>• Put together</li> <li>• Total</li> <li>• Addend</li> <li>• Earn</li> <li>• Credit</li> </ul>	<ul style="list-style-type: none"> <li>• Less than</li> <li>• minus</li> <li>• Take away from</li> <li>• Debt</li> <li>• Debit</li> <li>• Withdraw</li> <li>• Give</li> <li>• lose</li> <li>• drop</li> <li>• less</li> <li>• owe</li> <li>• difference</li> <li>• spend</li> </ul>	<ul style="list-style-type: none"> <li>• Times</li> <li>• <u>doubled</u></li> <li>• repeated addition</li> <li>• tripled</li> <li>• groups of</li> <li>• of</li> <li>• multiply</li> <li>• half</li> </ul>	<ul style="list-style-type: none"> <li>• Into</li> <li>• Divided by</li> <li>• Quotient</li> <li>• Over</li> </ul>	<p><u>Squares:</u>                      squared, times itself                      Cubed</p> <p><u>Variables:</u>                      'a certain number'</p> <p><u>Equals:</u>                      • Is                      • "you get"                      • "what remains"</p> <p>( ) → "the quantity of"</p>

**GUIDED PRACTICE:****Steps for Writing Equations Using Symbols**

1. Read the written description carefully. Underline the important words.
2. Define your variable.
3. Create an equation using symbols (numbers, variables, and operators) that represent the written description.

<p>The <u>sum</u> of 39 and <u>triple</u> a number is <u>6 times</u> that number.</p> <p>Let <math>x</math> be the number.</p> $39 + 3x = 6x$	<p>When you square half of a number and add 12, you get 5 times that number.</p> <p>Let <math>x</math> be the number.</p> $\left(\frac{1}{2}x\right)^2 + 12 = 5x$
<p>Paul has a <u>certain amount of money</u>. If he spends 6 dollars, then he has <math>\frac{1}{4}</math> of the original amount left.</p> <p>Let <math>x</math> be the original amount Paul has</p> $x - 6 = \frac{1}{4}x$	<p>When you add 8 to <math>\frac{4}{5}</math> of a number, you <del>x</del> get the number itself.</p> <p>Let <math>x</math> be the number</p> $8 + \frac{4}{5}x = x$ <p style="text-align: center;">4</p>
<p>The sum of 3 <u>consecutive</u> integers is 201.</p> <p>Let <math>x</math> be the second integer.</p> $x + (x+1) + (x-1) = 201$ $3x = 201$	<p>The sum of consecutive even integers is 486.</p> <p>Let <math>x</math> be the <u>3<sup>rd</sup></u> even integer</p> $x + (x+2) + (x-2) + (x-4) = 486$ $4x - 4 = 486$
<p>One number is 6 more than another number. The sum of <u>their squares</u> is 90.</p> <p>Let <math>x</math> be "another number"</p> $x^2 + (x+6)^2 = 90$ $x^2 + (x-6)^2 = 90$	<p>The sum of a number squared and three less than twice the number is 129. <del>x</del></p> <p>Let <math>x</math> be the number</p> $x^2 + (2x-3) = 129$

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Mr. Rogove

Date: \_\_\_\_\_

**INDEPENDENT PRACTICE:**

**Steps for Writing Equations Using Symbols**

1. Read the written description carefully. Underline the important words.
2. Define your variable.
3. Create an equation using symbols (numbers, variables, and operators) that represent the written description.

When a number is taken away from 57, what remains is four more than 5 times the number.	The sum of four consecutive even integers is $-28$ .
A number is four times larger than the square of half that number.	Steven has some money. If he spends \$9, he will have $\frac{3}{5}$ of the money he started with.
Monica had some cookies. She gave seven to her sister. Then she divided the remainder in half and she still had five cookies.	When you square five times a number, you get 3 more than the number.

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<p>Janet is three years older than her sister Julie. Janet's brother is eight years younger than their sister Julie. The sum of all their ages is 55.</p>	<p>The sum of 2 consecutive even integers divided by 4 is 189.5</p>
<p>Subtract seven more than twice a number from the square of one-third of the number to get zero.</p>	<p>Bruce took two trips last summer. One of the trips was 500 miles more than 4 times as long as the other trip. All together, their trips were 3,850 miles long</p>
<p>The Warriors were playing basketball against the Cavaliers. The Cavs scored 12 more than four-fifths of the total points that the Warriors scored. Together they scored 210 points in the game.</p>	<p>The product of 4 and 1 plus the quantity of eight times a number equals 3 times that number.</p>
<p>The sum of 12 and two-thirds of a number is the number itself.</p>	<p><b>WRITE YOUR OWN PROBLEM, SHOW IT TO YOUR FRIEND!</b></p>

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**ACTIVATING PRIOR KNOWLEDGE:**

Number string:

3 is 100% of what number?

3 is 50% of what number?

6 is 50% of what number?

3 is 25% of what number?

6 is 25% of what number?

3 is 10% of what number?

6 is 20% of what number?

3.8 is 10% of what number?

**CLOSURE:**

Write your own written equations (see page 4)

**TEACHER NOTES:**

Khan Writing expressions 1 and 2? HW??