

Algebra I
Lesson 1.1 – Variables and Expressions
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As we start out in the first course of algebra that you will be taking in high school let me first say that yes, this class is important. As a foundation course, your skills and ability to succeed in all other upper level math courses really depends upon your success in this class. A weak foundation will not support the house that gets built, but will collapse and crumble and will take down the house with it. Will you need algebra? Some of you will probably need it more than others, but that all depends on what you choose to do with yourself as you enter adulthood. In short, all people need and use math on a daily basis. Having a party? How much pizza should you order? Well, that depends on how many friends are going to come to your party. Woo! On a budget? Well, you better start using math to decide how many pizzas you can afford to buy on your budget, how many pieces of pizza you need per friend, and thus how many friends you can actually invite to come to the party! Woops! You neglected wash your hands after you went out shopping for your party and got sick. You better hope that the doctor is good in math as he will need to calculate how much of the antibiotic you need to take based on your body weight. Some drugs can be extremely dangerous if you take too much or completely ineffective if you don't take enough; so yeah, done lie about how much you weigh either!

Now what was just discussed involves some of the basic concepts of algebra, including some important vocabulary words:

- **Variable** – a letter or symbol used to represent a value that can change. (number of pizzas, number of guests to the party, or your weight)
- **Constant** – a value that does not change (your budget, the base charge for a doctor's visit)
- **Numerical expression** – contains only constants and operations
- **Algebraic expression** – contains variables, constants and operations
- **Algebraic equation** – algebraic expressions connected with an equal sign
- **Operation** – $+$, $-$, \times , and \div . It is expected that you understand these symbols and how they are used!

You will also need to be able to read and understand what is read; you may not always see math symbols, but be told words what math operation you are to do.

+	–	×	÷
Add	Subtract	Multiply	Divide
Plus, sum, increased by	Minus, difference Less than	Times, product, Equal groups of	Divided by, Quotient
Put together combine	Find out how much more or less	Put together in equal groups	Separate into equal groups

What are 2 ways to write each algebraic expression in words?

$x + 3$	$m - 7$	$k \div 5$
The sum of x and 3	The difference of m and 7	k divided by 5
x is increased by 3	7 less than m	The quotient of k and 5

$4 - n$

$\frac{t}{5}$

$9 + q$

$2 \cdot y$

$3(h)$

More often than not you will be dealing with an application problem and have to translate the words into an algebraic expression: Let's write some sentences into algebraic expressions. Once we get an expression, we can evaluate it by setting the variable equal to a certain number.

Joanne reads 19 pages per hour. Write an expression for the number of pages she reads in h hours.

- Solve if: Joanne reads 3 hours – $h=3$

Robert is 3 years younger than Mitchell who is y years old. Write an expression for Robert's age.

- Solve if: Mitchell is 17 years old – $y=17$

Juan runs a mile in 11 minutes. Write an expression for the number of miles that Juan runs in m minutes.

- Solve if: Juan runs for 55 minutes – $m=55$

Miriam is 5 inches taller than her sister, who is m in. tall. Write an expression for Miriam's height in inches.

- Solve if: Miriam's sister is 62 inches tall – $m=62$