

Algebraic Equations (Speedy Study Guide)

Speedy Study Guides **ALGEBRAIC EQUATIONS**

an equation obtained by equating to zero a sum of a finite number of terms each one of which is a product of positive integral powers (including the zero power) of the variables.

Mathematical statement of equality between algebraic expressions. An expression is algebraic if it involves a finite combination of numbers and variables and algebraic operations (addition, subtraction, multiplication, division, raising to a power, and extracting a root). Two important types of such equations are linear equations, in the form $ax + b = c$, and quadratic equations, in the form $ax^2 + bx + c = 0$. A solution is a numerical value that makes the equation a true statement when substituted for a variable. In some cases it may be found using a formula, as when the equation may be rewritten in simpler form. Algebraic equations are particularly useful for modeling real-life phenomena.

Basic or the Basics

variable constants
 $x + 33 = 65$
 equal sign or fulcrum

The diagram above shows a basic equation. This equation is similar to problems which you may have done in ordinary mathematics such as: $\dots + 16 = 33$

You must easily guess that ... equals 14 or do $33 - 16$ to find that equals 14.

In this problem, ... stood for an

unknown number. In an equation we use variables, or any letter in the alphabet.

When written algebraically the problem would be:
 $x + 16 = 33$

and the answer should be written:
 $x = 14$

Solve Equations

These equations can be solved relatively easily and without any formal method. But, as you use equations to solve more complex problems, you will want an easier way to solve them.

Pretend you have a scale like the one shown. On the right side there are 45 pennies and on the left side are 23 pennies and an unknown amount of pennies. The scale is balanced, therefore, we know that there must be an equal amount of weight on each side.

As long as the same operation (addition, subtraction, multiplication, etc.) is done to both sides of the scale, it will remain balanced. To find the unknown amount of pennies of the left side, remove 23 pennies from each side of the scale. This action keeps the scale balanced and isolates the unknown amount. Since the weight (amount of pennies) on both sides of the scale are still equal and the unknown amount is alone, we now know that the unknown amount of pennies on the left side is the same as the remaining amount (22 pennies) on the right side.

Because an equation represents a scale, it can also be manipulated like one. The diagram below shows a linear equation and the steps to solving it.

Initial Equation / Problem
 $x + 23 = 45$

Subtract 23 from each side
 $x + 23 - 23 = 45 - 23$

Result / Answer
 $x = 22$

The diagram below shows a more complex equation. This equation has both a constant and a variable on each side. Again, to solve this you must keep both sides of the equation equal; perform the same operation on each side to get the variable "X" alone. The steps to solving the equation are shown below.

Initial Equation / Problem
 $x + 23 = 2x + 45$

Subtract x from each side
 $x - x + 23 = 2x - x + 45$

Result
 $23 = x + 45$

Subtract 45 from each side
 $23 - 45 = x + 45 - 45$

Result
 $-22 = x$

Answer
 $x = -22$

Take a look at the equation below. As you can see, after the variable is subtracted from the left and the constants are subtracted from the right, you are still left with $2x$ on one side.

Initial Equation / Problem
 $x + 23 = 3x + 40$

Subtract x from each side
 $x - x + 23 = 3x - x + 40$

Result
 $23 = 2x + 40$

Subtract 40 from each side
 $23 - 40 = 2x + 40 - 40$

Result
 $-17 = 2x$

Divide the left and right sides of the equation
 $2x = -17$

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Reviews

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