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# Math Fundamentals 2 (Quickstudy: Academic)

BarCharts, Inc.® **WORLD'S #1 ACADEMIC OUTLINE**

## Math Fundamentals 2

Algebra - angles, exponents, equations, polynomials, functions & math roots

Boost math confidence & test scores!

**What is Algebra?** Algebra is the branch of mathematics that uses symbols (especially letters) to generalize certain arithmetical operations and relationships. Equations, inequalities, integers, polynomials and sequences are only some of the parts of algebra.

**Arithmetic**, which can be thought of as the ABCs of math, deals with computation and calculation; that is, non-negative real numbers and the application of basic mathematical operations—addition, subtraction, multiplication, division.

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### REAL NUMBER SYSTEM

Set of Rational Numbers  
Rational Numbers (The ratio of two integers; includes):  
Fractions:  $\frac{1}{2}, \frac{3}{4}, \frac{7}{8}, -\frac{1}{3}, \frac{12}{17}$   
Decimals:  
Terminating decimals: 3.3, 0.6, -7.3  
Repeating decimals: 0.7, 1.333..., -2.78  
Integers (All whole numbers and their opposites):  
-3, -2, -1, 0, 1, 2, 3, ...  
Whole Numbers (All the counting numbers plus 0):  
0, 1, 2, 3, 4, ...  
Natural Numbers (All the counting numbers):  
1, 2, 3, 4, 5, ...

**Real numbers** = set of rational numbers + set of irrational numbers

**Set of Irrational Numbers:** Non-terminating and non-repeating decimals, such as, irrational numbers CANNOT be written as the ratio of two integers.  
-3.141592654...  
 $\sqrt{5} = 1.7320508...$   
56.78432173... (Repeating dots indicate number doesn't terminate)  
All non-perfect-square numbers have irrational square roots:  
 $\sqrt{5} = 2.23606...$

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### BASIC ALGEBRA TERMS

**Simplify:** Combine any like terms; complete any operations within the problem.  
EX:  $3x + 2y + 6x = 9x + 2y$

**Evaluate:** Solve to evaluate  $3x + 2y$  when  $x = 4$  and  $y = 8$ ; substitute values for  $x$  and  $y$ , then solve.  
EX:  $3(4) + 2(8) = 12 + 16 = 28$

**Simplify Form:** All solutions must be in lowest terms.  
EX:  $\frac{2}{6} = \frac{1}{3}$   
 $3\frac{5}{8} = 4\frac{1}{4}$

**quick tip**  
0 less than a number:  $x - 0$   
a less than b:  $b - a$     8 less than 6:  $6 - 8$

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### BASIC ALGEBRA TERMS (continued)

**Coefficient:** The number being multiplied times the variable.  
EX:  $12x + 3$ , the coefficient is 12;  $x = 3$ , the coefficient (of  $x$ ) is 1

**Base:** The number or variable that has an exponent; the factor used by the exponent.  
EX:  $5^2 = 5 \times 5 = 25$ , the base is 5, exponent = 2

**Constant:** Value that does not change.  
EX:  $12x + 3$ , the constant is 3

**Term:** In an algebraic expression, a number or variable, or a product or quotient of numbers and variables; EX:  $5x^2 + 4x^3 - 3$  (three terms)

**Like Terms:** Terms with the exact same variables and exponents (coefficients can be different) or constants; like terms can be combined.  
EX:  $5x$  and  $3x$ ;  $xy^2$  and  $-3xy^2$ ; 4 and -8

**Unlike Terms:** Terms with different variables and exponents; EX:  $5x$ ,  $3y$

**Inverse Operation:** An operation that undoes another operation; subtraction undoes addition; EX:  $-3$  inverse is  $+3$ ; division undoes multiplication.  
EX: divide by 3 is the inverse of multiply by 3; the inverse of  $x$  would be  $\frac{1}{x}$

**Complex Fractions:** Numerator, denominator or both are fractions.  
EX:  $\frac{2}{\frac{3}{4}}$  means  $\frac{2}{3} \times 4$   
 $\frac{4\frac{1}{2}}{\frac{1}{2}}$  means  $4\frac{1}{2} \times \frac{1}{\frac{1}{2}}$

**Expressions:** Mathematical phrases that use variables and/or numbers, and operation symbols; expressions do NOT have equal signs; to solve an expression, use substitution and show all steps, each right below the other; simplify.  
EX: Evaluate  $3a + 2b$     Evaluate  $-5x + 3y - 6z$   
when  $a = 2$ , and  $b = 8$     when  $x = -2$ ,  $y = 3$ ,  $z = -9$   
 $3(2) + 2(8) = 6 + 16 = 22$      $-5(-2) + 3(3) - 6(-9) = 10 + 9 + 54 = 73$

**Equations:** Mathematical sentences using equal signs to show both sides of the equation have the same value; to maintain the same value, whatever operation is done on one side must also be done on the other side; to solve, make sure the variable stays on one side of the equal sign and all other numbers are moved to the other side by using inverse operations; simplify and solve.

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### One-Step Equations:

Solve using one inverse operation to isolate the variable.  
 $x + 5 = 10$      $x - 5 = 5$   
 $-5 = -5$   
 $x = 5$   
 $9 = y - 4$   
 $+4 = +4$   
 $13 = y$   
 $\frac{4x}{4} = \frac{12}{4}$   
 $x = 3$

### Two-Step Equations:

Solve using two inverse operations to isolate the variable; begin with value farthest from variable (on same side).  
 $2x + 10 = 12$      $16 = 3y + 21$   
 $-10 = -10$      $-21 = -21$   
 $\frac{2x}{2} = \frac{2}{2}$      $\frac{-5}{3} = \frac{3y}{3}$   
 $x = 1$      $-1 = y$

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### Equations with Distributive Property:

Distribute the value outside the parentheses to all values inside the parentheses; solve using several steps.  
 $4(5 + 3) = 20$      $-3(x - 4) = 15$   
 $20 + 12 = 20$      $-3x + 12 = 15$   
 $-12 = -12$      $-3x = 3$   
 $\frac{-3x}{-3} = \frac{3}{-3}$      $x = -1$   
 $x = \frac{3}{-3}$      $x = -1$

**ALWAYS** distribute a negative!

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## Synopsis

This fantastic overview of integers, exponents, equations, polynomials and functions is great for middle and high school students. It will help boost math confidence and test scores.

## Book Information

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## Customer Reviews

Another wonderful addition to the fundamental series. If you have used the first in this group you will understand the importance of having the complete set. This has a few tips and reminders that are on the first set but expand formulas and skills for the next level. What a great tool to have on hand for quick study and easy access to formulas and explanations. I love the way the steps are easy to follow, and the examples clearly identify how they should be used. I highly recommend this product.

I purchased Math Fundamentals 1-4 for my daughter. Math Fundamentals 2, like the others, is a jam-packed quick reference that she likes to keep in a 3 ring binder in her backpack so it is handy at school and for homework. I anticipate keeping it for a long time as a study guide for class and standardized tests. I also find it useful for myself when helping her with homework, but because of Math Fundamentals' great examples and thorough, easy to understand instructions, I don't think she will need to come to me for much help at all!

I have a 14yr old that I home school and he is having trouble with Math. These charts are very detailed and self explanatory and I would encourage anyone struggling in Math to try these out.

They really do help. The cost is very low and they deliver very very quickly!

I bought these for my daughter, she likes to have it handy when I am not available to help her. It has proven to be useful. I have not noticed if there is any misinformation, as I have not used it much.

As with all the mathematics Bar Charts I have ordered from , this one is a good resource for teachers and students alike. CT

I really have not used this It is great for students. convenient for placing in a notebook, binder or folder, these are laminated

The kids love this. Great for review of the basics of math courses and for working contracts and program management.

Ordered for grand kids, the parents couldn't put it down. Great gift.

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