

Math Equation Guide

Introduction

Edusoft uses a markup language called LaTeX to create well-formed math symbols and equations. When creating a test, you may create (or edit) questions which have equations. You must use the LaTeX codes described in this document for those equations. When you create equations, make sure the radio button next to "equation" is checked, rather than "text". See the Teacher Toolkit Manual for more details on the question creation process.

LaTeX Basics

For most regular characters (those you can find on your keyboard), you can just type them into your equation normally. They will be displayed on the test in a special italic font. For example, if you enter the equation: "x + y = 2" (without the quotes), on your test you will see:

$$x + y = 2$$

You can do this with any of the characters you see on your keyboard, except a few - see the next section of this document for the list of those exceptions.

Math symbols must be entered as special LaTeX codes, which typically (but not always) follow the format: "*\special-code*". That first character is a backslash, which can be found on your keyboard right above the Enter key. For example, if you enter the equation: "n: 1 \rightarrow 10", you will see:

$$n : 1 \rightarrow 10$$

A number of the most common LaTeX codes are listed on the next page of this document.

Special Characters

Some characters cannot be entered as-is into an equation. These characters have special meanings in LaTeX, and therefore need to be "escaped" before being entered. Remember that you only need to enter these characters this way if you are using them in an "equation." If you are adding "text" elements to your question, you can enter these characters normally.

| Character | How to Enter It | Output |
|------------|---------------------------------|--------|
| Ampersand | <code>\&</code> | & |
| Pound | <code>\#</code> | # |
| Dollar | <code>\\$</code> | \$ |
| Percent | <code>\%</code> | % |
| Underscore | <code>_</code> | - |
| Braces | <code>\{</code> <code>\}</code> | { } |
| Tilde | <code>\sim</code> | ~ |

LaTeX also handles all spacing within an equation itself, and will not always put spaces where you specify them. To force a space in your equation, you should enter the tilde character, "~", found above the Tab key on your keyboard.

Other Resources

There are many online resources for LaTeX. One web site you can go to for additional math LaTeX codes is: <http://www.giss.nasa.gov/latex/ltx-117.html>. Of course, you can contact Edusoft at 1-866-4-EDUSOFT with any questions as well.

Common LaTeX Codes

| Math Symbol | Sample LaTeX Code To Enter | Output |
|-------------------------|---|--|
| General | | |
| Times | <code>x \times y</code> | $x \times y$ |
| Division | <code>x \div y</code> | $x \div y$ |
| Fraction | <code>\frac{x}{y}</code> | $\frac{x}{y}$ |
| Power | <code>x^{y}</code> | x^y |
| Subscript | <code>x_{y}</code> | x_y |
| Square Root | <code>\sqrt{2}</code> | $\sqrt{2}$ |
| n^{th} Root | <code>\sqrt[3]{2}</code> | $\sqrt[3]{2}$ |
| Greater Than or Equal | <code>x \geq 2</code> | $x \geq 2$ |
| Less Than or Equal | <code>x \leq 2</code> | $x \leq 2$ |
| Plus or Minus | <code>x \pm 2</code> | $x \pm 2$ |
| Absolute Value | <code> x </code> | $ x $ |
| Geometry | | |
| Greek Letters | <code>\pi, \omega, \Omega, \sigma, \Sigma</code> | $\pi, \omega, \Omega, \sigma, \Sigma$ |
| Line Segment | <code>\overline{AB}</code> | \overline{AB} |
| Line | <code>\overleftrightarrow{AB}</code> | \overleftrightarrow{AB} |
| Ray | <code>\overrightarrow{AB}</code> | \overrightarrow{AB} |
| Perpendicular | <code>AB \perp CD</code> | $AB \perp CD$ |
| Parallel | <code>AB \parallel CD</code> | $AB \parallel CD$ |
| Angle | <code>\angle ABC</code> | $\angle ABC$ |
| Triangle | <code>\triangle ABC</code> | $\triangle ABC$ |
| Trigonometric Functions | <code>\sin x, \cos x, \tan x, \sec x, \csc x, \cot x</code> | $\sin x, \cos x, \tan x, \sec x, \csc x, \cot x$ |
| Lower-case script L | <code>\ell</code> | ℓ |
| Other | | |
| Arrows | <code>\leftarrow, \rightarrow</code> | \leftarrow, \rightarrow |
| Sum | <code>\sum</code> | \sum |
| Integral | <code>\int</code> | \int |
| Infinity | <code>\infty</code> | ∞ |
| Logarithms | <code>\log n, \ln n, \log_{2} n</code> | $\log n, \ln n, \log_2 n$ |

Keep in mind that the LaTeX codes can be combined and nested to produce more complicated formulas. For example:

$$\lim_{n \rightarrow \infty} \sum_{k=1}^n \frac{1}{k^2} = \frac{\pi^2}{6}$$

will produce:

$$\lim_{n \rightarrow \infty} \sum_{k=1}^n \frac{1}{k^2} = \frac{\pi^2}{6}$$