

Expression Translation into BASIC

Since most computers cannot yet understand human voice input, one must communicate through a keyboard, even if this form of communication carries restrictions. For example, one cannot enter English sentences, but must use a dialect such as BASIC, Pascal, LISP, etc....

This category builds the skills of expressing conventional mathematical equations in a notation that a computer can readily understand. The purpose of this category is NOT to use one's knowledge of mathematics to simplify the expression or to translate it into an equivalent expression. The purpose is to express the given expression into an exact BASIC translation. Students must avoid simplifying the given expression.

Our answers will be given in as simplified form as possible (ex. minimum number of parentheses necessary). The word "LET" is optional; the case of the variables (upper or lower) is optional; and extra parenthesis are allowed, unless the minimum number of parentheses is required.

Sample Problems

<p>Translate the following equation into a statement in BASIC. Do not simplify or express the equation in any equivalent form.</p> $S = \frac{N(N+1)}{2}$	<p>Expressions which are identical except that they contain additional parentheses and/or "LET" are acceptable. Changing to an equivalent expression is not acceptable. For example,</p> <p>valid: $S = N*(N+1)/2$ valid: $LET S = (N*(N+1))/2$</p> <p>invalid: $S = N*N+1/2$ invalid: $S = N*N/2+N/2$ invalid: $S = (N(1+N))/2$</p> <p>The third is illegal because it is not equivalent to the given equation; the fourth is illegal because it expands the given equation instead of translating it. The last is illegal because it is missing the multiplication operator ("*") <i>and</i> because it commuted the operands of the addition term of numerator.</p>
<p>Translate the following equation into a statement in BASIC. Do not simplify or express the equation in any equivalent form.</p> $Y = \frac{A + \frac{C}{D}}{B - A^2}$	<p>The solution (with the fewest number of parentheses) is</p> $Y = (A+C/D)/(B-A\uparrow 2)$ <p>Examples of invalid expressions are:</p> $Y = (A+C/D)/(B-A*A)$ $Y = A+C/D/(B-A\uparrow 2)$ $Y = (A+C/D)/B-A\uparrow 2$

If $A=1$, $B=4$ and $C=-3$, evaluate:

$$B^2 - 4AC$$

The value is the square of B minus the product of 4, A and C . Using the given values for the variables, the expression becomes

$$4^2 - 4 \cdot 1 \cdot (-3) = 16 + 12 = 28.$$

By the way, this expression computes the discriminant of the quadratic formula.