

Entering Answers in MapleTA

Because your answers will be graded by a computer program, you must use some care in entering your answers and follow some rules about the way mathematical expressions are entered. (On the other hand Maple TA can determine in many cases that two answers which appear to be different are the same, that is, Maple TA will attempt to determine whether your answer is equivalent to the correct answer.) The computer program will not give you credit for answers that it cannot understand even if there are only small differences between what you have entered and the correct answer. The first homework assignment covers part of what is explained below.

There are a variety of question types in MapleTA, but most require you to enter a mathematical expression or equation as the answer. There are two basic ways to enter these. One is to use a syntax like that of many calculators. This mode is called text mode in the MapleTA help files. The other method uses an applet and menus to allow you to choose symbols and entry forms. This second method, called symbol mode, has the advantage that expressions are constantly displayed in the more usual syntax with exponents as superscripts. The calculator syntax is faster for entry but care must be used in entering complex expressions. A missing parenthesis will result in the answer being marked incorrect. If you choose to use text mode, it is a good idea to use the preview option to display your answer in standard notation. If the displayed version is what you intended, then you can be reasonably certain that you have entered the proper syntax for your answer.

There is one important point that cannot be emphasized too strongly. For each problem be very careful to read the instructions for the form of the answer. For example if a problem requests the equation of the line through the origin with slope 3, e.g., $y=3x$, then entering $3x$ will be marked incorrect. In answering most types of questions, the system will accept a number next to a symbol as meaning that the number and the symbol are multiplied. In a few cases this is not true. In particular, if the directions say that the answer must use **Maple syntax**, then **all multiplications must be explicitly entered with ***. Also braces and square brackets should be used in answers only when specified in the instructions. I recommend that you always enter the multiplication symbols. Here are some examples.

$3x^2-2x+5$ can be entered as $3x^2-2x+5$ in most questions or as $3*x^2-2*x+5$ in all questions.

Use parentheses to control the order of evaluation. $\frac{x^{2y}}{xy+1}$ can be entered as $x^{(2y)}/(xy+1)$ or $x^{(2*y)}/(x*y+1)$. However $x^{2y}/x y+1$ would be interpreted as $\frac{x^{2y}}{x}y+1$ which is very different.

The system is case sensitive so $2X^3$ and $2x^3$ are different. In these assignments the constant π , which is the ratio of the circumference of a circle to its diameter, should be entered as `Pi`. The base for the natural logarithm should be entered as `e` and the exponential function with base e , e^x , can be entered as `e^x`.

You should be careful that you enter the exact value for any numerical answer unless you are told that an approximation is allowed and the degree of precision is given. In general decimal expressions given by your calculator are not exact. If the exact answer to a question is $1/3$ and you enter `.333333333`, it will be marked wrong. Thus if you are asked for the positive solution to $x^2 + x - 1$, the answer can be given as `(-1+sqrt(5))/2` but `.618033988` will be marked incorrect.

In some problems you may need to supply units, pay careful attention to the instructions for the problem. In such cases the units go in a separate answer box. If you include units when they are not requested your answer will be marked wrong.

There are some mathematical expressions that are written in an ambiguous way that you must be very careful entering into MapleTA. One source of problems is fractions written with a slanted division bar. It is quite common to see $1/2x$ written for $\frac{1}{2x}$. Because MapleTA reads your entry from left to right and inserts multiplication wherever it finds no operation between two numbers or symbols, `1/2x` will be interpreted as $(1/2)*x$, i.e., $\frac{x}{2}$.

Sometimes you will see in expressions in answers given by MapleTA that you would probably not write yourself. For example `1/2/x` is valid and is equivalent to $(1/2)/x$. This is the same as

$$\frac{\frac{1}{2}}{x} = \frac{1}{2x}.$$

You should be careful when converting standard mathematical expressions which are written in two dimensional form to the text mode syntax required by MapleTA. For example $x^{1/2}$ is often written for $x^{\frac{1}{2}}$. It may be tempting to enter this as `x^1/2` but MapleTA will interpret that as $(x^1)/2$, i.e., $\frac{x}{2}$. The correct expression is `x^(1/2)`.

To completely understand how an expression is interpreted by MapleTA it is necessary to understand the precedence of the operations and their bindings. For the most part the system behaves in a way that will not cause any difficulty so an intuitive understanding will normally be enough. Here are a few principles and examples to clear up some ambiguities that arise.

1. Functions must always be written using parentheses.

It is common to write $\sin x$ and $\ln x$ but for MapleTA it is necessary to write `sin(x)` and `ln(x)`.

2. Function application precedes exponentiation

Consider the following three expressions: $\sin x^2$, $\sin^2 x$ and $(\sin x)^2$. The last two are actually equal, but the second one is a little misleading. To enter $\sin x^2$ in MapleTA remember that first x is squared and then the sine of the result is computed, so we enter `sin(x^2)`.

For the second and third the sine of x is computed and then the result is squared. This can be entered as `(sin(x))^2` Because of precedence one set of parentheses can be dropped: `sin(x)^2`.

3. Exponentiation precedes multiplication and division

This rule allows us to write the polynomial $4x^2$ as `4 x^2` rather than `4 (x^2)`. To get $(4x)^2$ the parentheses are necessary: `(4 x)^2`.

In all of these cases we have relied on multiplication being implicit. If a problem says to use Maple syntax then the correct expressions would be `4*x^2` for $4x^2$ and `(4*x)^2` for $(4x)^2$.

4. Multiplication and division precede addition and subtraction.

Thus $2 + 3x + 4x^2$ can be entered as `2+3 x+4 x^2` or `2+3*x+4*x^2`.

5. Multiplication and division have equal precedence; addition and subtraction have equal precedence. With operators of equal precedence grouping proceeds from left to right.

This rule means that `x*y/z*w` is interpreted as $\frac{xyw}{z}$ since the left to right rule makes the expression equivalent to $((x*y)/z)*w$.

6. No valid expression contains two operation symbols which are not separated by a parenthesis, symbol or number.

This means that x^{-2} must be entered as `x^(-2)` and not `x^-2`.

If an expression contains constants you should not rely on implicit multiplication. If c is a constant, cx^2 will be interpreted as though cx is itself a variable and that variable is being squared. The best way to enter this is with multiplication explicit as in $c*x^2$