**FORMATTING GUIDE FOR EQUATIONS USING TEX ON VLE**

Language Conventions

There are two ways to identify a TeX sequence in your text: The first is to surround it with $$ markers. To invoke a particular command or control sequence, use the backslash, \. A typical control sequence looks like:

$$ x\ =\ \frac{\sqrt{144}}{2}\ \times\ (y\ +\ 12) $$

$$x\ =\ \frac{\sqrt{144}}{2}\ \times\ (y\ +\ 12)$$

Fraction and square root.

Additional spaces can be placed into the equation using the backslash \ with a space as a trailing character.

The second way to use TeX code is to surround it with \( and \). Any TeX that is surrounded by $$'s is rendered on its own line, separated from the rest of the paragraph. On the contrast, TeX code that appears between \( and \) appears right where it is used in a line and can thus be used to embed shorter formulas or variable names within ordinary text.

**Reserved Characters and Keywords**

Most characters and numbers on the keyboard can be used at their default value. As with any computing language, though, there are a set of reserved characters and keywords that are used by the program for its own purposes. TeX Notation is no different, but it does have a very small set of Reserved Characters. This will not be a complete list of reserved characters, but some of these are:

@ # $ % ^ & * ( ) .

To use these characters in an equation just place the \ in front of them like \$ or \%. If you want to use the backslash, just use \backslash. The only exception here seems to be the &, ampersand.

**Superscripts, Subscripts and Roots**

Superscripts are recorded using the caret, ^, symbol. An example for a Maths class might be:

$$ 4^2 \ \times \ 4^3 \ = 4^5 $$ This is a shorthand way of saying: (4 x 4) x (4 x 4 x 4) = (4 x 4 x 4 x 4 x 4) or 16 x 64 = 1024. $4^2 \ \times \ 4^3 \ = 4^5$

Subscripts are similar, but use the underscore character.

$$ 3x_2 \ \times \ 2x_3 $$ $3x_2 \ \times \ 2x_3$

This is OK if you want superscripts or subscripts, but square roots are a little different. This uses a control sequence.

$$ \sqrt{64} \ = \ 8 $$ $\sqrt{64} \ = \ 8$

You can also take this a little further, but adding in a control character. You may ask a question like:

$$ If \ \sqrt[n]{1024} \ = \ 4, \ what \ is \ the \ value \ of \ n?
$$ $If \ \sqrt[n]{1024} \ = \ 4, \ what \ is \ the \ value \ of \ n?$

Using these different commands allows you to develop equations like:

$$ The \sqrt{64} \ \times \ 2 \ \times \ 4^3 \ = \ 1024
$$ $The \sqrt{64} \ \times \ 2 \ \times \ 4^3 \ = \ 1024$

Superscripts, Subscripts and roots can also be noted in Matrices.

**Fractions**

Fractions in TeX are actually simple, as long as you remember the rules.

$$ \frac{numerator}{denominator} $$ which produces $\frac{numerator}{denominator}$.

This can be given as:

$\frac{5}{10} \ is \ equal \ to \ \frac{1}{2}.$

This is entered as:

$$ \frac{5}{10} \ is \ equal \ to \ \frac{1}{2}.$$

With fractions (as with other commands) the curly brackets can be nested so that for example you can implement negative exponents in fractions. As you can see,

$$\frac {5^{-2}}{3}$$ will produce $\frac{5^{-2}}{3}$

$$\left(\frac{3}{4}\right)^{-3}$$ will produce $\left(\frac{3}{4}\right)^{-3}$ and

$$\frac{3}{4^{-3}}$$ will produce $\frac{3}{4^{-3}}$

You likely do not want to use $$\frac{3}{4}^{-3}$$ as it produces $\frac{3}{4}^{-3}$

**Brackets**

As students advance through Maths, they come into contact with brackets. Algebraic notation depends heavily on brackets. The usual keyboard values of ( and ) are useful, for example:

$$d = 2 \times (4 - j)$$

This is written as:

$$ d = 2 \ \times \ (4 \ - \ j) $$

Usually, these brackets are enough for most formulae but they will not be in some circumstances. Consider this:

$$4x^3 + (x + \frac{42}{1 + x^4})$$

Is OK, but try it this way:

$$4x^3 + \left(x + \frac{42}{1 + x^4}\right)$$

This can be achieved by:

$$ 4x^3 \ + \ \left(x \ + \ \frac{42}{1 + x^4}\right) $$

A simple change using the \left( and \right) symbols instead. Note the actual bracket is both named and presented. Brackets are almost essential in Matrices.

**Ellipsis**

The Ellipsis is a simple code:

$$x_1, \ x_2, \ \ldots, \ x_n$$

Written like:

$$ x_1, \ x_2, \ \ldots, \ x_n $$