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Getting started with effective entry of equations in Word Template

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# Inserting an equation: alt+=

Here is an equation within some text.

Here is some text and a displayed equation.

Some more text.

* Changing inline to display
* Equation tools, design ribbon

**In all that follows a ■ means that you need to type a space!**

+ - / = () [] {} < > % !

|  |  |  |
| --- | --- | --- |
|  | 2\times■3 |  |
|  | 2\cdot■3 |  |

# Superscripts: ^

|  |  |  |
| --- | --- | --- |
|  | a^(b+c)■ |  |
|  | (a+b)^((c+d))■ |  |

# Subscripts: \_

|  |  |  |
| --- | --- | --- |
|  | a\_2■ |  |
|  | (a+b)\_((i+j))■ |  |

# Fractions

* Two different formats

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | 1/2■ |  |  | 1\/2**■** |  |

# Fractions and brackets

* Some brackets are part of the fraction structure

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | 1/a+b |  |  | 1/(a+b)■ |  |
|  | (a+b)/(c+d)■ |  |  | ((a+b))/((c+d))■ |  |

* Linear vs professional

# Roots: \sqrt

* & is used as a separator

|  |  |  |
| --- | --- | --- |
|  | \sqrt(2)■ |  |
|  | \sqrt(n&2)■ |  |

# Accents

* Some brackets are part of the structure
* Letter first, then name of accent
* Two spaces are needed to trigger

|  |  |  |
| --- | --- | --- |
|  | (x)\bar■■ |  |

# Examples: Building up equations

|  |  |
| --- | --- |
|  | (x)\bar■■=(x\_1+x\_2+x\_3+x\_4+x\_5)/5■ |

# Examples: Building up equations

|  |  |
| --- | --- |
|  | x=(-b\pm■\sqrt(b^2■-4ac)■)/(2a)■ |

# A wide range of symbols

* \ followed by symbol name

|  |  |  |
| --- | --- | --- |
|  | x\leq■y |  |

* Not all symbols have names – you can create your own

|  |  |  |
| --- | --- | --- |
|  | \nleq■ |  |

# Functions

* In built recognised functions

|  |  |  |
| --- | --- | --- |
|  | sin■ |  |
|  | sin^(-1)■ |  |
|  | sin^(-1)■x→ |  |

* You can create your own

# Other alphabets

## Greek

* \ followed by name of letter (case sensitive)

|  |  |  |
| --- | --- | --- |
|  | \delta■ |  |
|  | \Delta■ |  |

## Mathematical fonts

* \ followed by name then by letter (case sensitive)

|  |  |  |
| --- | --- | --- |
|  | \scriptR,\scriptr■ |  |
|  | \frakturR,\frakturr■ |  |
|  | \doubleR,\doubler■ |  |

# Stretchy brackets

* Matching brackets re-size automatically to the correct height

|  |  |  |
| --- | --- | --- |
|  | (a/b)■ |  |

# Examples: Standard differentiation notation

* Fraction structure is used to input differentiation notation

|  |  |  |
| --- | --- | --- |
|  | df/dx■ |  |

# Examples: Standard differentiation notation

* Building up an equation using some of the ideas so far

|  |  |
| --- | --- |
|  | d/d\theta■■(sin^(-1)■\theta■→)  =1/(\sqrt(1-\theta^2))■ |

# Examples: Standard partial differentiation notation

* Use the symbol \partial

|  |  |  |
| --- | --- | --- |
|  | \partial■f/\partial■x■ |  |
|  | \partial/\partial■x■(f(x,y))■ |  |

# More complex structures: Multi-sized symbols

* Some symbols exist in various sizes and may also have subscripts and superscripts

|  |  |  |
| --- | --- | --- |
|  | \sum■x\_i,\sum■■x\_i■→ |  |

|  |  |  |
| --- | --- | --- |
|  | \int■xdx,\int■■xdx→ |  |

# Examples: Building up equations with multi-sized symbols

|  |  |
| --- | --- |
|  | \sum\_(k=1)^n■k→=1/2■n(n+1) |

# Examples: Building up equations with multi-sized symbols

|  |  |
| --- | --- |
|  | (x)\bar■■=(\sum\_(i=1)^n■x\_i■→)/n■ |

# Examples: Building up equations with multi-sized symbols

|  |  |
| --- | --- |
|  | \int\_a^b■f(u)■■du/dx■dx→  =\int\_(u(a))^(u(b))■f(u)du |

# More complex structures: Vectors and matrices

* Use ‘matrix’ structure, a separator and a new row symbol

|  |  |
| --- | --- |
| **Code** | **Use** |
| \matrix(…) | Container for the matrix |
| & | Separator |
| @ | New row |

# Examples: Vectors and matrices

|  |  |
| --- | --- |
|  | (\matrix(1&0&0@0&1&0@0&0&1)■)■ |

# Examples: Vectors and matrices

* We can use ‘dots’ within matrices

|  |  |
| --- | --- |
|  | (\matrix(1&\cdots&0@\vdots&\ddots&\vdots@0&\cdots&1)■)■ |

# More complex structures: Multi-line equations

* Use ‘eqarray’ structure, a separator (marks position to align at) and a new line symbol

|  |  |
| --- | --- |
| **Code** | **Use** |
| \eqarray(…) | Container for the equation array |
| & | Separator (alignment point) |
| @ | New line |

# Basic example: Multi-line equations

|  |  |
| --- | --- |
|  | \eqarray(x&=1+2+3@&=6)■ |

# Over, under, above, below, left and right

## Stretchy accent-like symbols

* You can leave out the subscript/superscript if you wish

|  |  |  |
| --- | --- | --- |
|  | \overbrace(x+y)^z■ |  |
|  | \underbrace(x+y)\_z■ |  |

## Placing groups of symbols above or below

* Use \above or \below, the symbols placed above or below should be contained within brackets which are part of the structure

|  |  |  |
| --- | --- | --- |
|  | \to\above■(x)■ |  |
|  | \to\below■(x)■ |  |

* Try replacing with something more complicated in the above

# Examples: Building equations using some of the ideas above

## Limit notation

|  |  |
| --- | --- |
|  | e^x■=lim\below(n\to■\infty)■(1+x/n)^n■ |

## Piecewise function notation

* Multi-line equation with spacing using \emsp or \ensp
* Single bracket stretched to correct height using \right or \left

|  |  |
| --- | --- |
|  | f(x)={\eqarray(-x,\emsp&x<0@  x,\emsp&x\geq■0)■\right■■ |

# Numbered equations and references

## Creating a numbered equation structure

* Do this once and save it as an auto-correct

## Referring to an equation

* To refer back to a numbered equation by number so it updates