METBD 050
In-Class Notes - MathCad Day 1

Three kinds of regions:
TEXT
EQUATION
GRAPH

Text regions are started by typing a " symbol. Alternately, start typing... the equation region becomes a text region when you type the first space...

Format - Style to globally change the text font. Format the NORMAL style to set the font for all text regions.

Format - Equation to change the format of text in equations.

Arithmetic:
\[
\begin{align*}
1 + 1 &= 2 \\
2 \cdot \frac{8}{4} &= 4 \\
\frac{2 \cdot 8}{4} &= 4 \\
2.2 &= 4 \\
3 + 2.5 &= 13
\end{align*}
\]

Building Variables and Equations:
You have to define a variable if you want to use it in an equation.

\[
b := 2 \\
d := 4 \\
Area := b \cdot d
\]

A variable has to be declared ABOVE or to the LEFT of the position in which it will be used.

Area = 8

Moment of inertia = \(bd^3/12\)

\[
I := \frac{b \cdot d^3}{12} \\
I = 10.6667
\]

Use the space bar to change the appearance of the blue cursor in an equation region.

Sides of a Triangle Example:
\[
\begin{align*}
\text{adj} &:= 4 \\
\text{opp} &:= 3 \\
\text{hyp} &:= \sqrt{\text{adj}^2 + \text{opp}^2} \\
\text{hyp} &= 5
\end{align*}
\]

Trig Function Examples:
\[
\begin{align*}
\sin(30\text{deg}) &= 0.5 \\
\cos(30\text{deg}) &= 0.866 \\
\sin(30) &= -0.988 \\
\cos(30) &= 0.1543 \\
\sin(524) &= 0.5003 \\
\sin(30\text{deg}) &= 30.0029\text{deg}
\end{align*}
\]
Constants and Operators:

10! = 3628800
10 \cdot 9 \cdot 8 \cdot 7 \cdot 6 \cdot 5 \cdot 4 \cdot 3 \cdot 2 \cdot 1 = 3628800

e = 2.7183
e = \text{Natural log constant}

\pi = 3.1416
\pi = \text{pi is a reserved constant} \approx 3.1415926

4\pi = 12.5664

Area 0.0833 ft\(^2\) =

Type the units you want in the black square placeholder that appears at end of the equation region once the answer is displayed with the default units.

Area 7741.92 mm\(^2\) =

Area 12 in\(^2\) =

Area 0 acre =

Force Example:

F_{1000\text{lbf}} := 1000\text{lbf}

\theta := 20\text{deg}

F_x := F \cdot \cos(\theta)

F_x = 939.6926 \text{lbf}

F_x = 0.9397 \text{kip}

F_y := F \cdot \sin(\theta)

F_y = 342.0201 \text{lbf}

F_y = 0.342 \text{kip}

Literal subscripts: type the variable name, then a period, then the subscript.

Note: The y in the term F_y is a Literal Subscript.

Units Note:

lb = \text{pounds MASS}

lbf = \text{pounds FORCE}

NOTE: This document was prepared using MathCad 11. - E.R.E. 12/1/03