Assignment 2

March 14, 2014

Due by Friday March 28th (I know that is over spring break). But that due date is just in case you need extra time. I would prefer that you turn it in to me by Friday March 21st (one week from today).

Make sure you name your .tex file and the .pdf file with your full name. Like this: `DavidGoulette.tex`

I want your document to have 4 sections just like mine does and I want them to have the same titles as I have here.

For sections 1 and 2 below I want you to recreate what I have written in those sections verbatim. So I want to copy every detail exactly as I have it here to the best of your ability. This includes the text and the math. You will need to use some variable sized grouping symbols with `\left`, `\right`, or `\big`, `Big` etc.

Here are some things you will need for the math below in sections 1 and 2:

`\frac{numerator}{denominator}`	Fractions
`\sqrt{radicand}`	Square root
`\sqrt[index]{radicand}`	Other roots
`\int_{lower limit}^{upper limit}`	Integrals
`\sum_{lower limit}^{upper limit}`	Sums
`\pm`	"plus or minus"
`\log`	logs (for a base just use subscripts)
`\lfloor \rfloor`	the floor function symbols (for the first equation in section 1)

In section 3, I don't care what equations you align, just align something. I have an example below that you can copy if you want but you can put whatever you want.

1 Inline math, roots and fractions.

Here is a function: $f(x, y) = 17x^{23} + \cos(y) + \log_2\big(\lfloor xy \rfloor\big)$.

The equation $x^2 + 1 = 0$ has no real solutions. But $z^2 + 1 = 0$ has two solutions if we consider complex solutions. To get the solutions we need to find $z = \sqrt{-1}$. The solutions are $z = i$ and $z = -i$. When we do fractions in-line, we can do m/n or $\frac{m}{n}$. So if we have a bigger fraction we can do either $\frac{2x+1}{z^2-y}$, or $(2x + 1)/(z^2 - y)$.

Everybody should know that $x^{2/3} = \sqrt[3]{x^2}$ which is the same as $(\sqrt[3]{x})^2$.

2 Display math

Here is a summation that is numbered:

$$\sum_{i=0}^{n} i^2 = \frac{n(n+1)(2n+1)}{6} \tag{1}$$

Here is another summation that needs big parentheses:

$$\sum_{i=0}^{n} i^3 = \left(\frac{n(n+1)}{2}\right)^2.$$

The quotient rule:

$$\frac{d}{dx}\frac{f(x)}{g(x)} = \frac{g(x)f'(x) - f(x)g'(x)}{\big(g(x)\big)^2}$$

Let $ax^2 + bx + c = 0$. Then if $b^2 - 4ac \geq 0$, then the real solutions are

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}.$$

Here is an integral with some Greek letters:

$$\int_{\alpha}^{\beta} f(x)\,dx = F(\beta) - F(\alpha)$$

3 The `align` environment

Use the `align*` environment to align something without numbering it. I want at least 3 lines of aligned equations. It can be anything. (You do not have to try to emulate my example unless you want to). Here is an example that I copied right out of a multivariable calculus book:

$$\begin{aligned}
\Psi &= \iint\limits_S \mathbf{D} \cdot \mathrm{d}\mathbf{S} \\
&= \iint\limits_S \varepsilon_0 \mathbf{E} \cdot \mathrm{d}\mathbf{S} \\
&= \varepsilon_0 \iint\limits_S \frac{\mathbf{F}}{q_1} \cdot \mathrm{d}\mathbf{S} \\
&= \varepsilon_0 \iint\limits_S \frac{q_0}{4\pi\varepsilon_0} \frac{\mathbf{x}}{|\mathbf{x}|^3} \cdot \mathrm{d}\mathbf{S} \\
&= \frac{1}{4\pi} q_0 \iint\limits_S \frac{\mathbf{x}}{|\mathbf{x}|^3} \cdot \mathrm{d}\mathbf{S} \\
&= \frac{1}{4\pi} q_0 4\pi \\
&= q_0.
\end{aligned}$$

4 Your choice

Show me some math that you are interested in, or take one of your favorite textbooks and look for some math that looks interesting and see if you can figure out how to type it out. Put at least 3 equations or formulas or theorems or proofs or sets... (whatever you want). It can be simple. The point is that the more you play around the easier LaTeX will be.

If you are stuck on anything or if you have any questions feel free to post a question on piazza. Piazza has LaTeX built into it! So I can help you with syntax or whatever you want.