Math 291 Lab 3 Due Monday February 5, 2018

Instructions: Use $\mathbb{I}^{A}T_{E}X$ to typeset a document containing each component described below. Turn in your lab in D2L Brightspace. You should submit both your raw TeX (.tex) file and your compiled document (in either .dvi or .ps or .pdf form). Do *not* submit a .zip file.

You will be graded on both your raw T_EX code and the accuracy of your compiled document. Don't forget to include Lab3 in your filename and include a four-line name block similar to the one you did for Labs 1 and 2. And note that there are three parts to this lab, so look on the next page too.

Use the enumerate environment to automatically number things as in Lab 2. [Double-check when you are done that your numbers go up through 3, since there is a second page.]

1. Typeset each of the following. You need to determine the appropriate Math Mode to use, so pay close attention to which display mode is being used: *in-line, displayed, or hybrid, and whether or not there are equation numbers.*

(a)
$$\lim_{x \to 3^{-}} \left(\frac{1}{x^{2} - x - 6} - \frac{x + 2}{x^{2} - 9} \right)$$

(b)
$$\lim_{x \to 3^{-}} \left(\frac{1}{x^{2} - x - 6} - \frac{x + 2}{x^{2} - 9} \right)$$

(c)
$$A = \sum_{i=1}^{n} \frac{2}{3} \left(\frac{1}{2} f(x_{i}) \right)^{3} \Delta x_{i}$$

(d)
$$e^{i\theta_{i} \cdot 1}$$

$$A = \int_{\theta_1}^{\theta_2} \frac{1}{2} \left[r_o^2 - r_i^2 \right] \, d\theta$$

[Note: To get the right amount of space between the integrand and the differential (the $d\theta$), use a "\,".]

(e)

$$f^{+}(x) = \liminf_{h \to 0^{+}} \frac{f(x+h) - f(x)}{h}$$
(2)

[Use the command $\liminf.$]

(f)

$$\left[\left(\left| \frac{\bigcup_{\lambda \in \Lambda} A_{\lambda}}{\bigcap_{\lambda \in \Lambda} \overline{B}_{\lambda}} \right| \cdot \frac{1}{2} \right) + \frac{k}{k+1} \cdot \sqrt{k^2 + 1} \right] \right]_{0}^{10}$$

- - (a) $\vec{d} + \tilde{r} + \hat{a} + \acute{g} = \acute{o} \ddot{n}$ (b) $12\vec{\imath} + 8\vec{\jmath} - 3\vec{k} - (3\vec{\imath} - 5\vec{\jmath} - 4\vec{k}) = 9\vec{\imath} + 13\vec{\jmath} + \vec{k}$ (c) $\widetilde{xyz} + \widehat{pdq}$

(d)
$$\underbrace{x \cdot x} \ldots \cdot x = x^{10} \tag{3}$$

(e)

$$\overline{y}^2 - \overleftarrow{z^2} + \underbrace{\overleftarrow{y_2} - \overrightarrow{z_1}}$$

(f)
$$\binom{n}{k} \stackrel{\text{\tiny def}}{=} \frac{n!}{k! (n-k)!}$$

3. Typeset the following using either the align, multline, or split commands, as appropriate. Note that all have some version of an equation number, so use an environment that provides that.

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(a)

$$123x^8 - 456x^7 + 78x^6 - 90x^5 + 1x^4 + 2x^3 + 3x^2 \tag{4}$$

$$+4x+5-\sqrt{x^3-4x^4+5x^5-6x^6+7x^7-8x^8}$$
(5)

$$+\frac{1}{2} + \frac{2}{3} + \frac{4}{5} + \frac{5}{6} + \frac{7}{8} + \dots + \frac{99}{100}$$
(6)
$$3x + 2$$

$$\frac{3x+2}{1234567890x-9876543210}\tag{7}$$

(b)

$$123x^{8} - 456x^{7} + 78x^{6} - 90x^{5} + 1x^{4} + 2x^{3} + 3x^{2} + 4x + 5 - \sqrt{x^{3} - 4x^{4} + 5x^{5} - 6x^{6} + 7x^{7} - 8x^{8}} + \frac{1}{2} + \frac{2}{3} + \frac{4}{5} + \frac{5}{6} + \frac{7}{8} + \dots + \frac{99}{100} - \frac{3x + 2}{1234567890x - 9876543210}$$
(8)

(c)

$$123x^{8} - 456x^{7} + 78x^{6} - 90x^{5} + 1x^{4} + 2x^{3} + 3x^{2} + 4x + 5 - \sqrt{x^{3} - 4x^{4} + 5x^{5} - 6x^{6} + 7x^{7} - 8x^{8}} + \frac{1}{2} + \frac{2}{3} + \frac{4}{5} + \frac{5}{6} + \frac{7}{8} + \dots + \frac{99}{100} - \frac{3x + 2}{1234567890x - 9876543210}$$
(9)