Math 291
Lab 5
Due Monday March 11, 2019

Instructions: Use LaTeX 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 a form where the web link works, probably pdf). Do *not* submit a .zip file.

You will be graded on both your raw TeX code and the accuracy of your compiled document. **Don't forget to include Lab5 in your filename and include a four-line name block similar to the one you did for previous labs**.

1. Typeset the following using an array environment.

p	q	$\neg p$	$\neg p \vee q$	$p \vee q$	$\neg(p \vee q)$
T	T	F	T	T	F
T	F	F	F	T	F
F	T	T	T	T	F
F	F	T	T	F	T
			$\star$		$\star$

2. Typeset the following matrices or determinants, using the matrix shortcuts (that is, bmatrix, etc.) in the appropriate package and the appropriate math environment.

   (a)
   $$\begin{bmatrix} 3 & 7 \\ 2 & 1 \end{bmatrix} \tag{1}$$

   (b)
   $$\begin{vmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{vmatrix} \tag{2}$$

   (c)
   $$\begin{Bmatrix} \odot & \oplus \\ \otimes & \div \end{Bmatrix} \tag{3}$$

   (d)
   $$\begin{pmatrix} \alpha & \beta & \gamma \\ \delta & \epsilon & \zeta \end{pmatrix} \tag{4}$$

   (e)
   $$\left\| \begin{matrix} e^{x} & e^{-x} \\ e^{-x} & e^{x} \end{matrix} \right\| \tag{5}$$

3. Typeset the following sentence using the smallmatrix command:
   This is a silly little matrix $\left(\begin{smallmatrix} \heartsuit & \spadesuit \\ \diamondsuit & \clubsuit \end{smallmatrix}\right)$ that includes the suits from a deck of cards, and I note that the black suits are black, although the red suits are not red.

4. Use the cases environment from the amsmath package to type the following sentence (make sure to include the period that ends the sentence in the appropriate place).

   The function is defined by $f(x) = \begin{cases} 3x - 5 & \text{if } x > 4 \\ 5 - x^2 & \text{if } x \leq 4 \end{cases}$.

5. Type three parboxes in a line, each of the same width, with one or two words before the first box, another one or two words in between the first two boxes, another one or two words between the second and third boxes, and finally at least one word after the last box. Choose the width of your parboxes to keep it short enough that it fits on one line. Fill your boxes with word phrases that are at least four lines (within the box) long. Make the first box stick up over the outer line of text, the middle box hang down from the outer line of text, and the last box be centered with the outer line of text.

   I don't care what your text is, as long as it is appropriate for polite conversation.

6. Create a table with one row and four columns, using the appropriate commands in the tabular environment to create a box around your entire table, vertical bars between columns 1 and 2 and between columns 3 and 4, and a double vertical bar between columns 2 and 3. For each of the four entries in your column, create a minipage containing the same five-word sentence (you choose the sentence, as long as it is appropriate for polite conversation). Set the widths of your four minipages to be 0.5 cm, 1 cm, 2 cm, and 4 cm, respectively.