Pre-Assessment Evaluation - Math Prefresher - 9/2019
This is an assessment of your knowledge of topics we will cover in this course. You may know some or most of the answers, you may not. This will help me get to understand your background and how to focus our energies during our time together. Please do your best and don't stress if you're not sure.
Note: THERE ARE TWO SIDES!

Background questions:
Name, discipline and subfield?

What are you hoping to gain from this course?

Questions

1. Basics
   (a) Explain the significance or use of the following symbols:
      i. Π (note: different from π)
      ii. Σ
   (b) Solve: (no need to simplify but show steps/work if possible)
      i. $4 \geq x - 7$
      ii. $-9x + 2 > 3$
      iii. $|x - 2| \leq 2$
      iv. $2e^{6x} = 18$
      v. $e^{x^2} = 1$
      vi. $ln(x^2) = 5$
      vii. $\sum_{n=1}^{10} 3 + n$
      viii. $4!$
      ix. $(\frac{x^4 y^-3}{x^2 y^3})^3$
   (c) Factor
      i. $m^2 + 3m + 2$
      ii. $x^2 + 5x + 6$
      iii. $x^2 + x$
2. Set Theory
   (a) Explain the meaning of the following symbols:
      i. $\in$
      ii. $\forall$

(b) Suppose $A = \{3, 4, 5\}$, $B = \{$hat, triangle, forklift$\}$ and $C = \{x | x$ is a natural number$| x > 3$ and $x < 9\}$

i. What is $A \cup B$?

ii. Write the elements of C

iii. What is $A \cap C$?

3. Functions & Pre-Calculus

(a) What is a continuous function?

(b) Draw an increasing function.

(c) What is a tangent line? What does it do?

4. Matrix Algebra

(a) What experience do you have with matrix algebra?

(b) Give an example of a 3×4 matrix:

5. Calculus

(a) what is the derivative of $4x$?

(b) calculate the derivative of $3m^2 - 8m + 5$

(c) calculate the integral $\int_0^5 (x^3 + 0.5x^2 + 5x)dx$

(d) calculate the integral $\int e^x dx$

6. Probability

(a) What does $P(A)$ mean?

(b) What is an independent event?

(c) Define or explain Bayes' Rule:

(d) What is a Venn diagram? Give, draw and label an example.

7. Statistics

(a) What is the difference between continuous and discrete variables?

(b) What is a probability mass function? (define, explain, give an example)