**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!**

8 + 8.25 = 16.25

**Background questions:**

Name, discipline and subfield?

Molly Weinstein, MORS

What are you hoping to gain from this course? It has been 8 years since I took a stats class and longer since I've done straight math (with the exception of the GRE). I need a review to get up to speed, so that I can fully understand quantitative research.

**Questions** +8.25

1. Basics

(a) Explain the significance or use of the following symbols:

i. $\Pi$ (note: different from $\pi$) · Not sure!

0.75 ii. $\Sigma$ - sigma, means to sum - in a series

(b) Solve: (no need to simplify but show steps/work if possible)

1 i. $4 \geq x - 7$ (+7) (+7) $\quad 11 \geq x$

0.5 ii. $-9x + 2 > 3$ (-2) (-2) $\quad x > -\frac{1}{9}$ $x < -1/9$

iii. $|x - 2| \leq 2$ $\quad -9x \geq 1$ $\quad -7$ $\quad x \geq 4$ or $x \leq -4$ $\quad 0 \leq x \leq 4$

iv. $2e^{6x} = 18$

v. $e^{x^2} = 1$

vi. $ln(x^2) = 5$

Not sure!

1 vii. $\sum_{n=1}^{10} 3 + n$ $\quad 4+5+6+7+8+9+10+11+12+13 = 85$

1 viii. $4!$ $\quad 1 \cdot 2 \cdot 3 \cdot 4 = 24$

1 ix. $\left(\frac{x^4 y^{-3}}{x^2 y^3}\right)^3 \rightarrow \left(\frac{x^2}{y^6}\right)^3 \rightarrow \frac{x^6}{y^{18}}$

(c) Factor

3 i. $m^2 + 3m + 2$ $\quad (m+2)(m+1)$

ii. $x^2 + 5x + 6$ $\quad (x+3)(x+2)$

iii. $x^2 + x$ $\quad x(x+1)$

2. Set Theory +3

(a) Explain the meaning of the following symbols:

i. $\in$

ii. $\forall$ Not sure!

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

3

i. What is $A \cup B$? 3,4,5, hat, triangle, forklift

ii. Write the elements of C 4,5,6,7,8

iii. What is $A \cap C$? 4,5

3. Functions & Pre-Calculus +1

(a) What is a continuous function? When a function maps as a single curve

1 (b) Draw an increasing function.

Can be drawn w/o picking up pencil

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

Not sure! +0

4. Matrix Algebra

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

I believe I learned this in a course many years ago, but don't remember

(b) Give an example of a $3 \times 4$ matrix:

Not sure!

5. Calculus +0

Not sure

(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 $\int e^x dx$

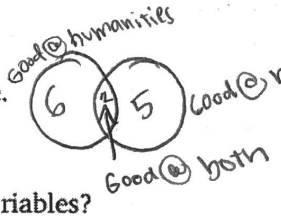
6. Probability +3

1 (a) What does $P(A)$ mean? The likelihood of event A occuring

1 (b) What is an independent event? The likelihood of one event occuring is not affected by other events (e.g. coin toss)

(c) Define or explain Bayes' Rule: Not sure!

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




6 students excel @ humanities
5 students excel @ math
2 students excel @ both

7. Statistics +1

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

Discrete = countable (e.g. yrs old), continuous = impossible to count b/c encompasses a continuity of values (e.g. age)

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

Not sure!