Pre-Assessment – Emma Davis

Background questions:

Name, discipline and subfield?

Emma Davis, Political Science, IR and Theory

14.25

What are you hoping to gain from this course?

To be honest, I do not see myself using empirical or quantitative methods in my work, but I have been told that this will be helpful to gain a basic familiarity with quantitative methods in the discipline so that I can read those kinds of papers.

1. Basics – answers in Red! Sorry there are a lot of blanks, I haven't done math since high school and I have forgotten a lot :/

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

   i. Π (note: different from π)

   ii. Σ

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

+2

   i. $4 \geq x - 7$

   $11 \geq x$

   ii. $-9x + 2 > 3$

   $X < -1/9$

   iii. $|x - 2| \leq 2$

   $0 \leq x \leq 4$

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

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

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

   vii. $\sum_{n=1} 3 + n$

   viii. $4!$

$4*3*2*1 = 24$

   ix. $(x^{4}y^{-3})^{3}$

~~X^6~~

(c) Factor

i. $m^2 + 3m + 2$

$(m+1)(m+2)$

ii. $x^2 + 5x + 6$

(x+2) (x+3)

iii. $x^2 + x$

x (x + 1)

2. Set Theory

(a) Explain the meaning of the following symbols:

i. ∈

ii. ∀

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

i. WhatisA∪B? 3, 4, 5, hat, triangle, forklift

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

iii. WhatisA∩C? 4, 5

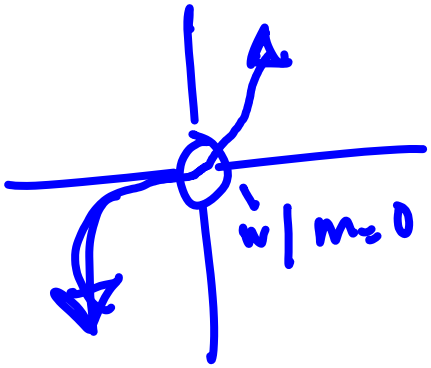
3. Functions & Pre-Calculus

(a) What is a continuous function?

A function that is not interrupted along the x-axis

(b) Draw an increasing function.

It would have a positive slope? → not always could be



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

It touches a point on a curve and tells you something about the curve

4. Matrix Algebra

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

I think none

(b) Give an example of a 3 × 4 matrix:

5. Calculus

(a) what is the derivative of 4x?

4

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

3m - 8

(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.

+0

7. Statistics

(a) What is the difference between continuous and discrete variables?
(b) What is a probability mass function? (define, explain, give an example)