Intro to Math for Political Scientists

Day 1 Homework

Fall 2015

- 1. Simplify the following expressions as much as possible.
 - 1. $9(3)^3$
 - 2. $(2a^2)(4a^4)$

 - 4. $\left(\frac{1}{27b^3}\right)^{1/3}$ 5. $y^7y^5y^6y^4$
- 2. Simplify the following, making the answer free of any negative exponents.

$$(a^2b^{-1}c^{3/5})(a^{-3}b^{1/2}d^{1/4})$$

- 3. Solve for x in the following:
 - 1. $\sqrt[4]{625} = x$
 - 2. $\sqrt[x]{64} = 4$
 - 3. $log_{10}(1) = x$
 - 4. $log_{10}(x) = 3$
 - 5. $ln\left(\frac{1}{3^{3/2}}\right) = x$ 6. ln(e) = x

 - 7. $log_2\left(\frac{1}{8}\right) = x$
 - 8. $log_x(64) = 3$
 - 9. $log_5(5^{20}) = x$
 - 10. $ln(e^{82}) = x$
 - 11. $e^{ln(3)} = x$
- 4. Take the logarithm of the following function and use the rules for logs to make it linear (additive instead of multiplicative).

$$y = x^2 z^3 w^4$$

- 5. $e^{1-x} = x$ Solve for x.
- 6. The concentration of alcohol in a person's blood is measurable. Suppose that the risk R (as a percentage) of having an accident while driving a car can be modeled by the following equation:

$$R = 3e^{kx}$$

where x is the concentration of alcohol in the blood and k is a constant.

- 1. Suppose that a concentration of alcohol in the blood of 0.06 results in a 10 percent risk (R=10)of an accident. Find the constant k in the equation.
- 2. Using this value of k, what is the risk if the concentration is 0.17?
- 3. Using the same value of k, what concentration of alcohol corresponds to a risk of 100 percent?
- 4. If the law asserts that anyone with a risk of having an accident of 15 percent may not drive, at what concentration of alcohol in the blood should a driver be arrested for DUI?
- 7. If you have time, it's a good idea to familiarize yourself with the Greek alphabet