MTH 441 - EXAM 2 HISTORICAL PERSPECTIVES Due 1 p.m. May 3, 2010

Please write up your answers neatly on a separate paper. You may use any resource except directly consulting classmates. .The point value for each question is in parentheses following question number.

_1. (10) Use the Fundamental Theorem of Calculus to find an antiderivative for $f(x) = \exp(-x^2/2)$ on the interval [0, 1].

_2. (5) Explain why 0/0 is indeterminate.

_3. (5) Explain why 1/0 is undefined.

_4. (5) Explain why 1 is not considered a prime number. Use the Fundamental Theorem of Arithmetic in your answer.

_5. (5) Explain why 0! = 1.

_6. (9) (This one's easier than it looks!) Find a website that deals with transfinite cardinal addition and solve the following. Here $\aleph$ = the Hebrew letter "aleph".

a) $\aleph_0 + \aleph_{10}$ b) $\aleph_{53} + \aleph_{107}$ c) $\aleph_0 + 8$

_7. (5) In view of the previous problem, what's the rule for transfinite cardinal addition?

_8. (5) Steph - What are some of the ways that we see game theory, either as a child or on television?

_9. (6) Spike - What is the probability of winning on the initial roll of a game of Craps?
What is the probability of losing on the initial roll of a game of Craps?

_10. (5) Lindsey - What are the basic steps of Edward Thorp's Counting Fives Method?

_11. (5) Jason - What will always be observed as constant in all reference frames?

_12. (5) Tim - What is the primary difference between fuzzy logic and binary logic?

_13. (5) Sarah - According to my presentation, what mathematical operation is used to arrive at the Black-Scholes equation as it is stated?
a. arithmetic b. counting c. limits d. partial differentiation

_14. (5) Meagan - Approximately, how many combinations are there for a standard 3x3x3 cube to be arranged?

_15. (5) Chris – What is the name of the astroid that was tracked by Gauss for 40 days, and was then lost behind the glare of the sun?

_16. (5) Jessica – Who is considered to be the Father of Fractal Geometry?

_17. (5) Mike – What is significant about the proof of the four-colour theorem?

_18. (5) Cam - ??? Draw a Golden Rectangle and derive the Golden Ratio $(1 + \sqrt{5})/2$