Name: _____

GSI Name: _____

Section Time: _____

MATH 32 FALL 2012

MIDTERM 2

Start time: 8:10am

End time: 9:00am

No books, notes, calculators, or electronic devices allowed.

Please show your work and provide explanations where appropriate. If you need more space, you may use the backs of the pages or extra paper, but make a note that you did so.

Problem	Score	Out of
1		6
2		12
3		12
4		12
5		12
6		6
Total:		60

MATH 32 FALL 2012 MIDTERM 2

(1) (6 points) Find all values of x satisfying $2\log_5(x) + \log_{25}(x) = 5$.

(2) A population of rabbits starts at 10 and doubles every 3 months.
   (a) (6 points) Write down an expression for the rabbit population after t months have passed.

   (b) (6 points) After how many months do you expect to have 200 rabbits? Write your answer as precisely as possible.

(3) The equation $x^2 - 2x + 4y^2 + 24y + 33 = 0$ describes an ellipse.

    (a) (6 points) Write this equation in the form $\frac{(x-h)^2}{a^2} + \frac{(y-v)^2}{b^2} = 1$.

    (b) (3 points) What is the center of the ellipse?

    (c) (3 points) What is the area of the ellipse?

(4) Consider the rational function
$$f(x) = \frac{(2x+4)(3x-1)(x+1)}{x^3 + x}$$
You do *not* need to sketch a graph of f.

(a) (3 points) Does f have a horizontal asymptote? If so, what is it?

(b) (3 points) Does f have any vertical asymptotes? If so, what are they?

(c) (3 points) Does f have a y-intercept? If so, what is it?

(d) (3 points) Does f have any x-intercepts? If so, what are they?

(5) (a) Find a point (x, y) so that $(4, -3)$ is the midpoint of the line segment connecting $(6, -\frac{9}{2})$ and (x, y).

(b) What is the length of this line segment?

(6) (6 points) Using the approximation formula $e^t \approx 1 + t$ when t is small, approximate the value of

$$\frac{e^{2.04}e^{3.002}}{e^5}$$