Math 115 **Exam 3** **November 21, 2014**

Name _____

- Do not open this test until I say start.
- Turn off all electronic devices and put away all items except a pen/pencil and an eraser.
- No calculators allowed.
- You must show sufficient work to justify each answer.
- Quit working and close this test booklet when I say stop.

1. (5 points) Find all the asymptotes of $q(x) = \dfrac{6x - 7 - x^2}{x + 5}$

2. (5 points) Find $\lim\limits_{x \to -4^-} \dfrac{5x - x^2}{x + 4}$

3. (8 points) Solve $\log_2(x + 6) - 2 = \log_2(5 - x)$

4. (10 points) The general function $m(t) = m_0 e^{kt}$ is used to model the number of pantry moths in my kitchen, where the time t is measured in hours. Supposed the kitchen initially contains 21 moths. After 3 hours, the moth count is 35. Find the exact time it took for the moth count to grow to four times its initial size.

5. (8 points) Simplify the following expressions

   (a) $\log_{25} \frac{1}{5} + \log_{\sqrt{3}} 3^{-2} - \log_6 1$

   (b) $\ln e^{3 \ln e^2} + 4^{-2 \log_4 \left(\frac{1}{2}\right)}$