Math 176 — Quiz 7
Professor Busken **Name:** _____

Directions: You may NOT use a calculator or any other electronic devices. Show your work on ALL of the questions. Do NOT work together. Tutor help NOT okay. Due Thursday, September 26th.

1. (4 points) Suppose $f(x) = \dfrac{x^2 - 11x - 21}{2x - 3}$.
   (a) Find the slant asymptote for f. (a) _____
   (b) Describe the end behavior of the graph of f.
   (b) _____

2. (2 points) Solve $3xe^x(x^2 - 7x + 20)(x^2 - 16) \geq 0$. 2. _____

3. (2 points) Use the Rational Zeros Theorem to list the set of possible zeros for $f(x) = -6x^7 - x - 10$. 3. _____

4. (2 points) Describe the end behavior of the graph of $f(x) = -6x^7 - x - 10$. 4. _____

5. (4 points) Describe the behavior of the function $f(x) = \dfrac{x^2 - 3}{x^3 - x^2}$ around its vertical asymptote(s).

5. _____

6. (3 points) Find the complex zeros of $f(x) = x^2 - 3x + 11$.

6. _____

7. (3 points) Solve $e^{2x} + 6 = 5e^x$ for x.

7. _____

8. (3 points) Solve $2x^3e^{2x} - 4xe^{2x} = 0$ for x.

8. _____

9. (2 points) Solve $\log_x(25) = 2$ for x.

9. _____

10. (6 points) Newton's Law of Cooling is used in homicide investigations to determine the time of death. The normal body temperature is 98.6° F. Immediately following death, the body begins to cool. It has been determined experimentally that the constant in Newtons Law of Cooling is approximately $k = 0.1947$, assuming that time is measured in hours. Suppose that the temperature of the surroundings is 42° F.

    (a) Find a function $T(t)$ that models the temperature t hours after death.
    (b) If the temperature of the body is now 64° F, how long ago was the time of death.

11. (2 points) Describe the end behavior of the graph of $g(x) = -\ln(x-5)$

11. _____

12. (6 points) Suppose you invest \$750 at an interest rate of 5% per year. Find the amounts in the account after 6 years if interest is compounded quarterly, monthly, and daily.

13. (6 points) The half-life of Plutonium-239 is 24,000 years.
    (a) If a sample has a mass of 150 kg, find a function that models the mass that remains after t years.
    (b) Find the mass that will remain after 1000 years.
    (c) After how many years will only 15 kg remain?