HOMEWORK 6 - MATH 111
DUE DATE: Friday, October 18
INSTRUCTOR: George Voutsadakis

Read each problem very carefully before starting to solve it. Each question is worth 1 point. It is necessary to show your work. Correct answers without explanations are worth 0 points.

GOOD LUCK!!

1. Find the equations of the vertical and horizontal asymptotes of the function $f(x) = \frac{x^2 - 2x - 3}{x^2 - 7x + 10}$.

2. Graph on the same axis the functions $f(x) = 5^x, g(x) = 5^{-x}$ and $h(x) = -5^x$. Before graphing compute their values at $x = 0$ and $x = 1$ and depict those clearly on your graphs.

3. Solve the equation $5^{x^2} = 25^{2x - \frac{3}{2}}$.

4. Solve the equation $7^{-x+5} = (\frac{1}{7})^{2x-3}$.

5. Culture studies in the lab have determined that the population of an organism A as a function of time t is given by $f(t) = e^{t^2 - 2t}$. At the same time, the population of another organism B in the same culture has been declining according to the function $g(t) = e^{-2t+1}$. At what time will the two organisms have the same populations in the culture?

6. Compute $\ln(\sqrt[6]{e})$ and $\ln(e^7)$ without using a calculator.

7. If $\ln x = 3$ and $\ln y = 4$ find $\ln(\sqrt{x} \cdot y^2)$.

8. Solve the equation $\log_2 x - \log_2(x - 3) = 3$.