

HOMEWORK 5 - MATH 111

DUE DATE: Friday, October 17

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. Create the sign table and graph the function $f(x) = x^4 - 6x^2 + 8$.
2. Study the function $f(x) = \frac{2x-7}{-5x+2}$. (**Studying** here means what we did in class for rational functions: Find the domain, find the x - and y -intercepts, find the horizontal and vertical asymptotes and then roughly plot the graph.)
3. Find the equations of the vertical and horizontal asymptotes of the function $f(x) = \frac{x^2-4x+3}{x^2-6x+5}$.
4. Graph on the same axes the functions $f(x) = 3^x$, $g(x) = 3^{-x}$ and $h(x) = -3^x$. Before graphing compute their values at $x = -1, x = 0$ and $x = 1$ and depict those *clearly* both on a small table *and* on your graphs.
5. Solve the equation $9^{x^2} = 81^{\frac{3}{2}x+5}$.
6. Solve the equation $7^{3x+7} = (\frac{1}{7})^{5x-8}$.
7. Culture studies in the lab have determined that the population of an organism A as a function of time t is given by $f(t) = e^{t^2}$. At the same time, the population of another organism B in the same culture has been increasing according to the function $g(t) = \sqrt{e^{16t+40}}$. At what time will the two organisms have the same populations in the culture?
8. Compute $\ln(\sqrt[5]{e^{15}})$ and $\ln(e^{\frac{2}{5}})$ without using a calculator.