

HOMEWORK 5 - MATH 111

DUE DATE: Friday, February 28

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 $f(x) = x^4 - 7x^2 + 12$.
2. Study the function $f(x) = \frac{3x-6}{6x-1}$. (**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 $f(x) = \frac{x^2-2x-3}{x^2-7x+10}$.
4. Graph on the same axes the functions $f(x) = 7^x$, $g(x) = 7^{-x}$ and $h(x) = -7^x$. 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 $7^{x^2} = 49^{4x-\frac{7}{2}}$.
6. Solve the equation $11^{-2x+5} = \left(\frac{1}{11}\right)^{-2x+3}$.
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 $\ln(\sqrt[3]{e})$ and $\ln(e^{13})$ without using a calculator.