EXAM 2 - MATH 140
DUE DATE: Tuesday, October 19
INSTRUCTOR: George Voutsadakis

Read each problem very carefully before starting to solve it. Each question is worth 3 points. It is necessary to show your work. Correct answers without explanations are worth 0 points.

GOOD LUCK!!

1. Graph the piece-wise defined function $f(x) = \begin{cases} |x - 1|, & \text{if } x \leq 3 \\ -(x - 4)^2 + 2, & \text{if } x > 3 \end{cases}$ making sure to label some of the critical points in your graph. Then find the domain and the range of f.

2. Use the sign table method to make a rough sketch of the graph of the function $f(x) = x^4 - 7x^3 - 8x^2$. Then find the solution set of the inequality $x^4 - 7x^3 - 8x^2 < 0$.

3. Find the domain, the intercepts, the asymptotes, create the sign table and then roughly sketch the graph of the function $f(x) = \frac{2x+14}{x^2-2x-3}$. Then find the solution set of the rational inequality $\frac{5}{x-3} - \frac{3}{x+1} \leq 0$.

4. An open box with a square base is required to have a volume of 10 cubic feet. Express the amount A of the material used to make such a box as a function of the length x of the side of the square base.

5. Let $f(x) = \frac{x-1}{x+3}$ and $g(x) = \frac{2}{x+7}$. Find a formula for the composite $f \circ g$ and then determine its domain.

6. The function $f(x) = \frac{3x+4}{2x-5}$, $x \neq \frac{5}{2}$ is one-to-one. Find its inverse and then determine the domain and the range of f.