HOMEWORK 1 - MATH 140
DUE DATE: Wednesday, September 8
INSTRUCTOR: George Voutsadakis

Read each problem very carefully before starting to solve it. One part of each homework problem will be chosen at random and graded. Each question is worth 1 point. It is necessary to show your work. Correct answers without explanations are worth 0 points.

GOOD LUCK!!

1. (a) Find the roots of the equation $x^3 - 3x^2 - x + 3 = 0$ by factoring.

    (b) Solve the linear inequality $3x + 4 > \frac{1}{3}(x - 2)$ and graph the solution set.

2. Find the distance between the two points $P = (-2, 5)$ and $Q = (4, 1)$. Then find the midpoint of the line segment $\overline{PQ}$.

3. Find the intercepts of $y = 3x - 9$ and then use them to sketch its graph.

4. Find the center and the radius of the circle that is represented by the equation $x^2 + y^2 - 6x + 2y + 9 = 0$.

5. Test for symmetry with respect to the x-axis, the y-axis and the origin the equation $y = \frac{x}{x^2+9}$.

6. Consider the function $f(x) = \frac{2x}{x-2}$.

    (a) Is $(\frac{1}{2}, -\frac{2}{3})$ on the graph of f?

    (b) If $x = 4$ what is $f(x)$?

    (c) Find the domain of f.

    (d) Find the x- and the y-intercepts of the graph of f.

7. Find the domain, symmetry, monotonicity and local extrema of the function $y = f(x)$ whose graph is sketched below.

8. Use your calculators to graph the function $f(x) = x^4 - x^2$ in the interval $(-2, 2)$. Then find for this graph the domain, symmetry, monotonicity and local extrema.