Present neatly on separate paper. Justify for full credit. No Calculators.

Name _____ Score _____ A x 5

1)

Use the sketching guidelines to discuss the given function completely. Your analysis should conclude with a neat sketch.

$$y = \frac{x}{x^2 + 9}$$

2)

What is the smallest possible area of the triangle that is cut off by the first quadrant and whose hypotenuse is tangent to the parabola $y = 4 - x^2$ at some point?

3)

Show that the equation $x^4 + 4x + c = 0$ has at most two real roots.

Present neatly on separate paper. Justify for full credit. No Calculators.

Name _____ Score _____ F x 5

1)

Use the sketching guidelines to discuss the given function completely. Your analysis should conclude with a neat sketch.

$$y = \frac{x - 1}{x^2}$$

2)

Let a and b be positive numbers. Find the length of the shortest line segment that is cut off by the first quadrant and passes through the point (a, b).

3)

Show that the equation $x^3 - 15x + c = 0$ has at most one root in the interval $[-2, 2]$.