MATH 1110 – Survey of Calculus October 8, 2012

Exam 1

No calculators. Show your work. Clearly mark each answer.

1. (20 points) State the domain and the range of the function $1 - x^2$. Is this function even or odd? Sketch the graph.

2. (10 points) Write the equation of the line passing through the points $(1, 2)$ and $(3, 5)$.

3. (20 points) Solve the following equations:

   (a)
   $$4^{x+2} = 16^{x-5}.$$

   (b)
   $$2^x = 5^{6-x}.$$

   (c)
   $$\log(x) + \log(x-3) = 0.$$

   (d)
   $$\ln(x) - \ln(x-1) = \ln 5.$$

4. (30 points) Suppose that the demand and price for a certain product is given by the relation
   $$p = D(q) = 6 - 0.25q,$$
   where p is the price (in dollars) and q is the quantity (in thousands) demanded. Suppose the price and supply are related by
   $$p = S(q) = 0.35q,$$
   where p is the price (in dollars) and q is the quantity (in thousands) supplied.

   (a) Find the price for 2000 level of demand.
   (b) Find the price for 4000 level of demand.
   (c) Find the supply quantity for price \$0.
   (d) Find the supply quantity for price \$3.5.
   (e) Sketch the demand and the supply functions on the same graph.
   (f) Find the equilibrium quantity and the equilibrium price.

5. (20 points) Suppose you invest \$1000 dollars at 8% annual interest rate.

   (a) Find the interest earned in 1 year with interest compounded quarterly?
   (b) Find the interest earned in 2 years with interest compounded semiannually?
   (c) Find the interest earned in 2 years with interest compounded continuously?
   (d) Assuming the interest compounded continuously, how long will it before the amount doubles?