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) \(\ln(x) - \ln(x-1) = \ln5\).

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 semianually?
   (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?