Assignment 8

1. Sketch a complete graph of the function $f(x) = \frac{x^2}{x^2-4}$. You should cheek for asymptotes, local extrema and inflection points and mark these clearly on the graph. You may use the fact that $f''(x) = \frac{24x^2+32}{(x^2-4)^3}$.

2. Consider the demand equation

$$q = f(p) = \frac{1}{\sqrt{1+p}}.$$

(a) Find the elasticity of demand function $E(p)$.

(b) When $p = 10$, how will an increase in price affect the profit?

3.

4. You invest $100,000 now at 3% interest. How much will you have after 5 years?

   (b) You invest $200,000 now at a fixed interest rate. After 10 years your investment doubles. How much longer must you wait till your investment triples?

   (c) You invest $ P at the beginning of the year 2000 at an interest rate of 5%. What must P be in order to be able to withdraw $10000 at the beginning of 2010, then $ 20000 at the beginning of 2012?

5. Suppose that Lindo cafe sells 400 half kilogram bags of Colombian coffee per week when it is priced at $10 per 500 gms. For every $1 per bag increase in price, it sells 10 fewer bags of coffee. Recall that the price elasticity of demand is given by $e(p) = \frac{p}{q}\frac{dq}{dp}$.

   (a) Find the demand equation for Lindo's Colombian coffee. Use p for price and q for the demand.

   (b) Compute $e(p)$ for this demand function.

   (c) If the price is 12 and increases by 4%, what is the percentage change in demand? You may leave your answer in the simplest calculator-ready form you can find.

   (d) Will the Lindo cafeś revenue increase or decrease as a result of the price change in part (c)? Explain your answer.