MATHS 104   **Test II**

Question 1:

(a)   **i-**   Find the coordinates of all relative maxima and the relative minima for the graph of the function $f(x) = 8x^2 - x^4$

Do not sketch

    ii-   Find the intervals for which $f(x) = x.e^{-x}$ is increasing

(b)   Find the elasticity of demand for the equation $p = 1200 - q^2$ at $q = 20$,
What type (class) of elasticity of demand is this?

Question 2:

(a)   Demand equation of a certain product is given by $q^2 + p = 300$
where q units are sold at price p B.D.

    i-   Find the maximum possible revenue of this product.

    ii- At what price should the product be sold to guarantee the maximum revenue.

b-   If $\dfrac{dy}{dx} = 6x^2 - 8x + 1$ and $y = 7$ when $x = 2$, Find the value of y when $x = 4$.

Question 3:

Find the following integrals: [Any three]

(i) $\displaystyle\int (x^3 - \frac{1}{x} + \frac{2}{\sqrt{x}} - x^e + (\ln 3)x + 100)\ dx$

(ii) $\displaystyle\int \frac{1}{x + x \ln x}\ dx$

(iii) $\displaystyle\int x.e^{\ln(x+1)}\ dx$

(iv) $\displaystyle\int \frac{\left(x^{1/3} - 1\right)^{10}}{x^{2/3}}\ dx$