Assignment 6.

1. Find the equation of the tangent to the curve defined by $x = e^t + t$, $y = 2e^t - t^2$ at the point where $t = 0$.   [6]

2. Find the equation of the normal to the curve defined by $xy = x^2 - \ln y$ at the point $(1,1)$.   [6]

3. Find the exact coordinates of the points on the curve $y = (x^2 - x)e^{-x}$ at which $\dfrac{d^2y}{dx^2} = 0$.   [7]

4. Determine all maximum and minimum points of the curve $y = 2\sin 2x - \cos 4x$ for which $0 \le x \le \pi$.   [8]

5. A curve is defined by $x = \sqrt{\sin\theta}$, and $y = \cos\theta$ for $0 \leq \theta \leq \pi$.

   (a) Sketch this curve in a Cartesian plane. [2]

   (b) Express this curve as an implicit function. [1]

   (c) (†) Find the coordinates of the points on the curve which are furthest away from the origin. [5]

Total mark of this assignment: $30 + 5$.

The symbol (†) indicates a bonus question. Finish other questions before working on this one.