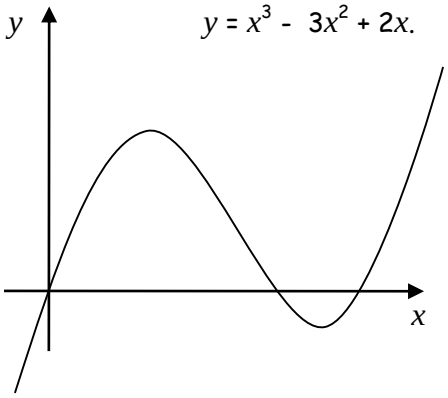
Higher Homework 08

1) a) The point (-3,0) lies on the graph of $y = \ln(x+k)$. Find the value of k.

b) The point (5,1024) lies on the graph of $y = a^x$. Find the value of a.

2) A curve has equation $y = 5x^2 + 2$. Find the equation of the tangent to the curve at the point where $x = -1$.

3) The diagram shows a sketch of the graph of $y = x^3 - 3x^2 + 2x$.



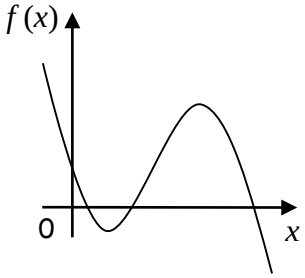
(a) Find the equation of the tangent to this curve at the point where $x = 1$.

(b) Find the equation of the tangent to this curve at the point where $x = -4$.

4) A function f is defined by $f(x) = 2x^3 - 3x^2 + 6$. Find the coordinates of any stationary points on the graph of this function and determine their nature.

5) The diagram shows the graph of the function $f(x)$.

Make a sketch of the derived function $f'(x)$.

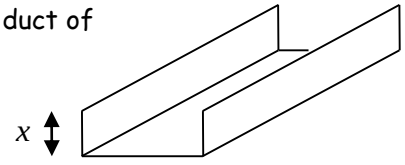


6) Find the stationary values of the following function and determine their nature.

$$h(p) = 4p(12 - p^2)$$

7) A steel strip mill has rolled a long strip of steel 1 metre wide. At each side, x cm are to be bent up as shown to create a water duct of rectangular cross section.

Find the value of x which will allow the duct to carry as much water as possible.



8) Find the coordinates of the point on the curve $y = 2x^2 - 7x + 10$ where the tangent to the curve makes an angle of 45° with the positive direction of the x-axis.