**C1 Chapter 8: FURTHER DIFFERENTIATION (AS MATHS)**

**Name: ………………………………..**

**Score: Percentage: Grade: Target grade:**



**1)** The curve with equation *y* = *x*3 - 10*x*2 + 28*x* is sketched below.

The curve crosses the *x*-axis at the origin O and the point

A(3, 21) lies on the curve.

a) Find  [3]

b) Hence show that the curve has a stationary point at *x* = 2 and find the *x*-coordinate of the other stationary point. [4]

**2)** For the curve *C* with equation *y* = *x*4 – 8*x*2 + 3,

1. find , **(2)**
2. find the coordinates of each of the stationary points, **(5)**
3. determine the nature of each stationary point. **(3)**

[Edexcel June 2003]



**3)** The diagram below shows a rectangular sheet of metal 24 cm by 9cm.

A square of side *x* cm is cut from each corner and the metal is then folded along the dotted lines to make an open box with a rectangular base and height *x* cm.

a) Show that the volume, *V* cm3, of liquid that the box can hold is given by . [3]

b) (i) Find  [3]

(ii) Show that any stationary values of *V* must occur when *x*2 – 11*x* + 18 = 0. [2]

(iii) Solve the equation *x*2 – 11*x* + 18 = 0. [2]

(iv) Explain why there is only one value of *x* for which V is stationary. [1]

c) (i) Find . [2]

(ii) Hence determine whether the stationary value is a maximum or a minimum. [2]

[AQA Jan 2005]

**4)** A curve is defined, for *x* > 0, by the equation *y* = f(*x*), where



a) Express  in the form , where p and q are integers. [2]

b) (i) Hence differentiate f(*x*) to find . [2]

(ii) Hence show that f is an increasing function. [2]

[AQA January 2005]

**The topics that I need to study further are …**