IB Math Studies **Name** _____
Topic 7, EXAM Review **April 12, 2011**

36. Consider the function $f(x) = 2x^3 - 5x^2 + 3x + 1$.

(a) Find $f'(x)$.

(3)

(b) Write down the value of $f'(2)$.

(1)

(c) Find the equation of the tangent to the curve of $y = f(x)$ at the point (2, 3).

(2)
(Total 6 marks)

37. Consider the function $f(x) = \frac{1}{2}x^3 - 2x^2 + 3$.

(a) Find $f'(x)$.

(2)

(b) Find $f''(x)$.

(2)

(c) Find the equation of the tangent to the curve of f at the point (1, 1.5).

(2)
(Total 6 marks)

38. The function $f(x)$ is such that $f'(x) < 0$ for $1 < x < 4$. At the point P (4, 2) on the graph of $f(x)$ the gradient is zero.

(a) Write down the equation of the tangent to the graph of $f(x)$ at P.

(2)

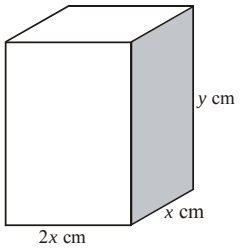
(b) State whether $f(4)$ is greater than, equal to or less than $f(2)$.

(2)

(c) Given that $f(x)$ is increasing for $4 \le x < 7$, what can you say about the point P?

(2)
(Total 6 marks)

39. A closed rectangular box has a height y cm and width x cm. Its length is twice its width. It has a fixed outer surface area of 300 cm^2.



(a) Show that $4x^2 + 6xy = 300$.

(2)

(b) Find an expression for y in terms of x.

(2)

(c) Hence show that the volume V of the box is given by $V = 100x - \frac{4}{3}x^3$.

(2)

(d) Find $\frac{dV}{dx}$.

(2)

(e) (i) Hence find the value of x and of y required to make the volume of the box a maximum.

(ii) Calculate the maximum volume.

(5)
(Total 13 marks)

40. The cost per person, in euros, when x people are invited to a party can be determined by the function

$$C(x) = x + \frac{100}{x}$$

(a) Find $C'(x)$.

(3)

(b) Show that the cost per person is a minimum when 10 people are invited to the party.

(2)

(c) Calculate the minimum cost per person.

(2)
(Total 7 marks)