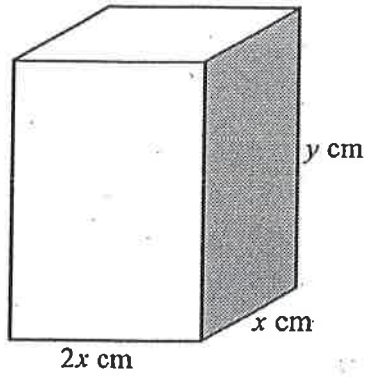
CALCULUS
DAY 4 ASSIGNMENT + Review Set A (attach by staple)

Name _____

Per ____

(A)

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)

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)

B

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)

Do HH Ch. 10 — Review Set A, Staple to this sheet