7 Two numbers x and y are such that $3x - y = 4$

$S = 5x^3 + y^2$

(a) Show that $S = 5x^3 + 9x^2 - 24x + 16$

(2)

Given that x can vary,

(b) use calculus to find the value of x for which S is a minimum, justifying that this value of x gives a minimum value of S

(5)

(c) Find the minimum value of S

(2)

Question 7 continued

(Total for Question 7 is 9 marks)