9 $f(x) = 7 + 4x - 2x^2$

Given that $f(x)$ can be written in the form $P(x + Q)^2 + R$ where P, Q and R are constants,

(a) find the value of P, the value of Q and the value of R.

(3)

(b) hence write down

(i) the maximum value of $f(x)$,

(ii) the value of x for which this maximum occurs.

(2)

The curve C has equation $y = 7 + 4x - 2x^2$

The line l with equation $y = 4 - x$ intersects C at two points.

(c) Find the x coordinates of these two points.

(3)

The finite region bounded by the curve C and the line l is rotated 360° about the x-axis.

(d) Use algebraic integration to find, to 3 significant figures, the volume of the solid generated.

(5)

Question 9 continued

Question 9 continued

Question 9 continued

(Total for Question 9 is 13 marks)