10 (a) Show that $\dfrac{3}{\sqrt{9-3x}} = \left(1 - \dfrac{x}{3}\right)^{-\frac{1}{2}}$

(2)

(b) Hence expand $\dfrac{3}{\sqrt{9-3x}}$ in ascending powers of x up to and including the term in x^3

expressing each coefficient as an exact fraction in its lowest terms.

(3)

$$f(x) = \dfrac{1 + 2x}{\sqrt{9-3x}}$$

(c) Find the expansion of $3f(x)$ in ascending powers of x up to and including the term in x^3 expressing each coefficient as an exact fraction in its lowest terms.

(4)

(d) Hence, using algebraic integration, obtain an approximation to 6 significant figures for

$$\int_{0.1}^{0.2} \dfrac{1 + 2x}{\sqrt{9-3x}}\, dx$$

(4)

Question 10 continued

P 6 6 0 2 7 R R A 0 3 1 3 6

Question 10 continued

Question 10 continued

(Total for Question 10 is 13 marks)

P 6 6 0 2 7 R R A 0 3 3 3 6

11 The points A and B have coordinates $(-3, -5)$ and $(7, 5)$ respectively.

(a) Find an equation for the line AB

(2)

The point C has coordinates $(p, 1)$ where $p < 0$

Given that AC and BC are perpendicular,

(b) prove that $p = -5$

(7)

The point D, where BCD is a straight line, is such that C divides BD in the ratio $4:3$

(c) Find the coordinates of D

(2)

(d) (i) Find the exact length of AC

   (ii) Hence, or otherwise, find the area of triangle ABD

(4)

Question 11 continued

Question 11 continued

(Total for Question 11 is 15 marks)

TOTAL FOR PAPER IS 100 MARKS