10 The curve C with equation $y = \dfrac{6 - 3x}{x - 4}$ where $x \neq 4$, crosses the x-axis at the point P and the y-axis at the point Q

(a) Find the coordinates of

(i) P \qquad (ii) Q

(2)

(b) Write down an equation of the asymptote to C which is

(i) parallel to the y-axis \qquad (ii) parallel to the x-axis

(2)

(c) Sketch C showing clearly the asymptotes and the coordinates of the points P and Q

(3)

The line L is the normal to C at the point on C where $x = 2$

(d) Find an equation of L

(6)

The line L intersects C again at the point R

(e) Find the x coordinate of R

(3)

Question 10 continued

Question 10 continued

Question 10 continued

(Total for Question 10 is 16 marks)

11 The roots of a quadratic equation E are α and β where $\alpha > \beta > 0$

Given that $\alpha - \beta = 2\sqrt{6}$ and $\alpha^2 + \beta^2 = 30$

(a) show that

    (i) $\alpha\beta = 3$

(4)

    (ii) $\alpha + \beta = 6$

(2)

(b) Without solving E

    (i) find the value of $\alpha^4 + \beta^4$

(2)

    (ii) find the exact value of $\alpha^4 - \beta^4$

(2)

Given that $\alpha^4 = P + Q\sqrt{6}$ where P and Q are positive integers,

(c) find the value of P and the value of Q

(2)

Question 11 continued

P72866A03536

Question 11 continued

(Total for Question 11 is 12 marks)

TOTAL FOR PAPER IS 100 MARKS

P 7 2 8 6 6 A 0 3 6 3 6