10 Given that $2\log_y x + 2\log_x y = 5$

(a) show that $\log_y x = \frac{1}{2}$ or $\log_y x = 2$

(5)

(b) Hence, or otherwise, solve the equations

$$xy = 27$$

$$2\log_y x + 2\log_x y = 5$$

(6)

Question 10 continued

Question 10 continued

Question 10 continued

(Total for Question 10 is 11 marks)

11

$$f(x) = 4 + 3x - x^2$$

(a) Write $f(x)$ in the form $P - Q(x + R)^2$, where P, Q and R are rational numbers.

(2)

The curve C has equation $y = 4 + 3x - x^2$

(b) Find the coordinates of the maximum point of C.

(1)

The line l_1 is a tangent to C at the point where $x = 1$

(c) Find an equation for l_1

(5)

Another line l_2 is perpendicular to l_1 and is also a tangent to C.

The lines l_1 and l_2 intersect at the point A.

(d) Find the coordinates of A.

(5)

The point B with coordinates $(-3, 2)$ lies on l_1

(e) Find the exact length of AB.

(2)

The point D with coordinates $(8, 0)$ lies on l_2

(f) Find the exact area of triangle ABD.

(3)

Question 11 continued

Question 11 continued

Question 11 continued

Question 11 continued

(Total for Question 11 is 18 marks)

TOTAL FOR PAPER IS 100 MARKS