$f(x) = 6x - x^2 \qquad x \in \mathbb{R}$ 

Given that f(x) can be written in the form  $D(x + E)^2 + F$  where D, E and F are integers,

(a) find the value of D, the value of E and the value of F.

(3)

- (b) Find
  - (i) the maximum value of f(x),
  - (ii) the value of x for which the maximum occurs.

(2)

The curve C has equation y = f(x)

The curve S has equation  $y = x^2 - 4x + 8$ 

The curve S intersects the curve C at two points.

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

(4)

The finite region R is bounded by the curve C and the curve S.

(d) Use algebraic integration to find the area of R.

(4)


Quest	stion 10 continued	



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Question 10 continued	

Question 10 continued
(Total for Question 10 is 13 marks)



11	The points $A$ and $B$ have coordinates $(-1, 3)$ and $(5, 6)$ respectively.	
	(a) Find an equation for the line AB.	
		(2)
	The point $P$ divides $AB$ in the ratio $2:1$	
	(b) Show that the coordinates of $P$ are $(3, 5)$	(2)
	The point C with coordinates $(m, n)$ , where $m > 0$ , is such that CP is perpendicular to the line AB.	
	Given that the radius of the circle which passes through A, P and C is 5	
	(c) find the value of m and the value of n.	
	(c) This the value of m and the value of n.	(6)
	The point $D$ with coordinates $(p, q)$ is such that the line $AD$ is perpendicular to the line $AB$ and the line $DC$ is parallel to the line $AB$ .	
	(d) Find the value of $p$ and the value of $q$ .	
		(3)
	(e) Find the area of trapezium ABCD.	
		(4)

Que	stion 11 continued



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Question 11 continued	

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	(Total for Question 11 is 17 marks)
	TOTAL FOR PAPER IS 100 MARKS