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1. Find the coordinates of the stationary point on the curve with equation $y = 2x^2 - 12x$.

(4)

Lined area for writing the answer.

(Total 4 marks)

Q1



Question 2 continued

Lined writing area for Question 2 continued.

(Total 6 marks)

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Q2

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3. (a) Use the factor theorem to show that $(x + 4)$ is a factor of $2x^3 + x^2 - 25x + 12$.

(2)

(b) Factorise $2x^3 + x^2 - 25x + 12$ completely.

(4)

20 horizontal lines for writing answers.





Question 3 continued

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Q3

(Total 6 marks)



Question 4 continued

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Lined area for writing the answer to Question 4.

(Total 6 marks)

Q4



N 2 3 4 9 2 B 0 9 2 8

Question 5 continued

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Lined writing area for the answer to Question 5.

(Total 8 marks)

Q5



6. A river, running between parallel banks, is 20 m wide. The depth, y metres, of the river measured at a point x metres from one bank is given by the formula

$$y = \frac{1}{10}x\sqrt{20-x}, \quad 0 \leq x \leq 20.$$

- (a) Complete the table below, giving values of y to 3 decimal places.

x	0	4	8	12	16	20
y	0		2.771			0

(2)

- (b) Use the trapezium rule with all the values in the table to estimate the cross-sectional area of the river.

(4)

Given that the cross-sectional area is constant and that the river is flowing uniformly at 2 ms^{-1} ,

- (c) estimate, in m^3 , the volume of water flowing per minute, giving your answer to 3 significant figures.

(2)



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7. In the triangle ABC , $AB = 8$ cm, $AC = 7$ cm, $\angle ABC = 0.5$ radians and $\angle ACB = x$ radians.

(a) Use the sine rule to find the value of $\sin x$, giving your answer to 3 decimal places. (3)

Given that there are two possible values of x ,

(b) find these values of x , giving your answers to 2 decimal places. (3)

Horizontal lines for writing answers.



Question 7 continued

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Lined writing area for the answer to Question 7.

(Total 6 marks)

Q7



N 2 3 4 9 2 B 0 1 5 2 8

8. The circle C , with centre at the point A , has equation $x^2 + y^2 - 10x + 9 = 0$.

Find

(a) the coordinates of A , (2)

(b) the radius of C , (2)

(c) the coordinates of the points at which C crosses the x -axis. (2)

Given that the line l with gradient $\frac{7}{2}$ is a tangent to C , and that l touches C at the point T ,

(d) find an equation of the line which passes through A and T . (3)



Question 9 continued

(Total 10 marks)

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Q9



10.

Figure 1

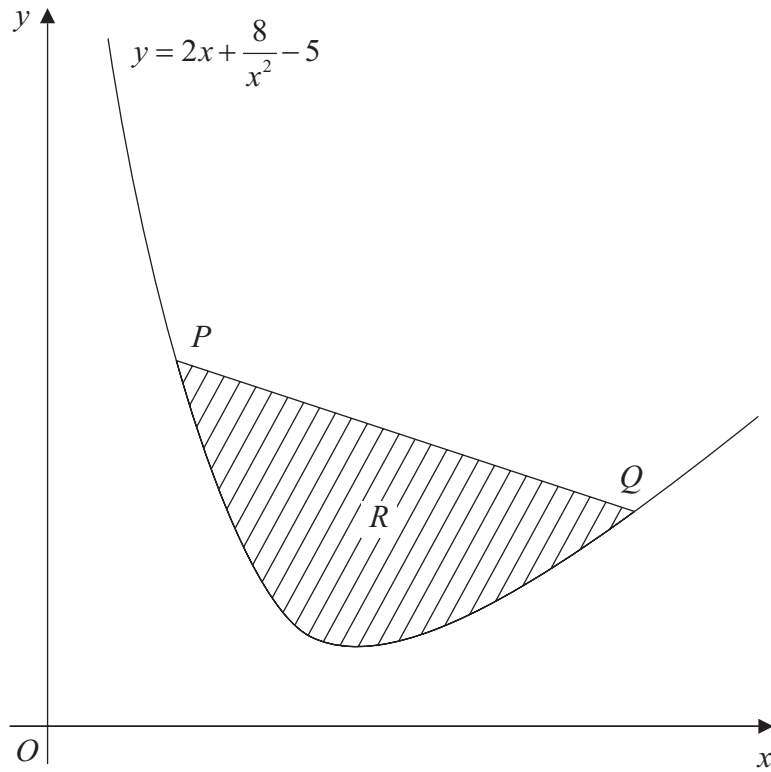


Figure 1 shows part of the curve C with equation $y = 2x + \frac{8}{x^2} - 5$, $x > 0$.

The points P and Q lie on C and have x -coordinates 1 and 4 respectively. The region R , shaded in Figure 1, is bounded by C and the straight line joining P and Q .

(a) Find the exact area of R . (8)

(b) Use calculus to show that y is increasing for $x > 2$. (4)



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Question 10 continued

Q10

(Total 12 marks)

TOTAL FOR PAPER: 75 MARKS

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