

Write your name here

Surname

Other names

Pearson
Edexcel GCE

Centre Number

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Candidate Number

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Core Mathematics C1

Advanced Subsidiary



Wednesday 17 May 2017 – Morning
Time: 1 hour 30 minutes

Paper Reference

6663/01**You must have:**

Mathematical Formulae and Statistical Tables (Pink)

Total Marks

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Calculators may NOT be used in this examination.

Instructions

- Use **black** ink or ball-point pen.
- If pencil is used for diagrams/sketches/graphs it must be dark (HB or B). Coloured pencils and highlighter pens must not be used.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions and ensure that your answers to parts of questions are clearly labelled.
- Answer the questions in the spaces provided
– *there may be more space than you need.*
- You should show sufficient working to make your methods clear. Answers without working may not gain full credit.

Information

- The total mark for this paper is 75.
- The marks for **each** question are shown in brackets
– *use this as a guide as to how much time to spend on each question.*

Advice

- Read each question carefully before you start to answer it.
- Try to answer every question.
- Check your answers if you have time at the end.

Turn over ►

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Pearson

1. Find

$$\int \left(2x^5 - \frac{1}{4x^3} - 5 \right) dx$$

giving each term in its simplest form.

(4)

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3. A sequence a_1, a_2, a_3, \dots is defined by

$$a_1 = 1$$

$$a_{n+1} = \frac{k(a_n + 1)}{a_n}, \quad n \geq 1$$

where k is a positive constant.

(a) Write down expressions for a_2 and a_3 in terms of k , giving your answers in their simplest form. **(3)**

Given that $\sum_{r=1}^3 a_r = 10$

(b) find an exact value for k . **(3)**

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Question 3 continued

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Q3

(Total 6 marks)



5.

$$f(x) = x^2 - 8x + 19$$

- (a) Express $f(x)$ in the form $(x + a)^2 + b$, where a and b are constants. (2)

The curve C with equation $y = f(x)$ crosses the y -axis at the point P and has a minimum point at the point Q .

- (b) Sketch the graph of C showing the coordinates of point P and the coordinates of point Q . (3)

- (c) Find the distance PQ , writing your answer as a simplified surd. (3)

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Question 5 continued

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(Total 8 marks)

Q5



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6. (a) Given $y = 2^x$, show that

$$2^{2x+1} - 17(2^x) + 8 = 0$$

can be written in the form

$$2y^2 - 17y + 8 = 0 \tag{2}$$

(b) Hence solve

$$2^{2x+1} - 17(2^x) + 8 = 0 \tag{4}$$

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Question 6 continued

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(Total 6 marks)

Q6



7. The curve C has equation $y = f(x)$, $x > 0$, where

$$f'(x) = 30 + \frac{6 - 5x^2}{\sqrt{x}}$$

Given that the point $P(4, -8)$ lies on C ,

(a) find the equation of the tangent to C at P , giving your answer in the form $y = mx + c$, where m and c are constants. (4)

(b) Find $f(x)$, giving each term in its simplest form. (5)

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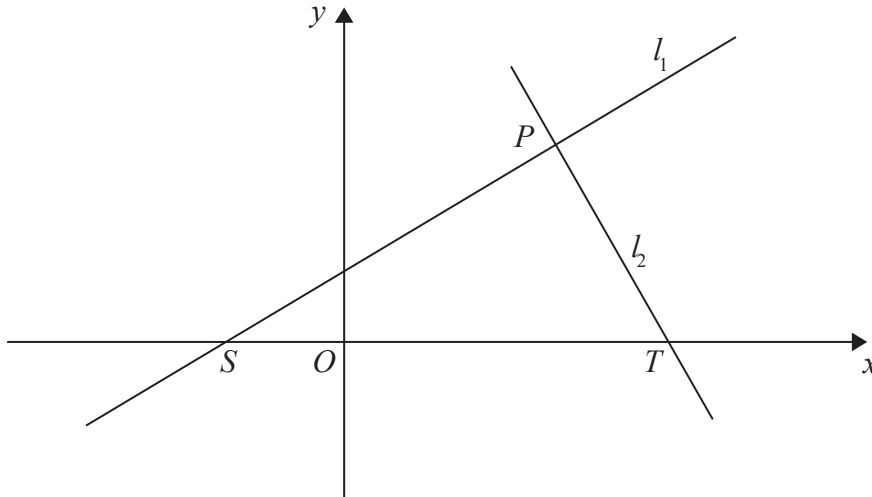


Figure 1

The straight line l_1 , shown in Figure 1, has equation $5y = 4x + 10$

The point P with x coordinate 5 lies on l_1

The straight line l_2 is perpendicular to l_1 and passes through P .

- (a) Find an equation for l_2 , writing your answer in the form $ax + by + c = 0$ where a , b and c are integers. (4)

The lines l_1 and l_2 cut the x -axis at the points S and T respectively, as shown in Figure 1.

- (b) Calculate the area of triangle SPT . (4)

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Question 8 continued

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Question 8 continued

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9. (a) On separate axes sketch the graphs of

(i) $y = -3x + c$, where c is a positive constant,

(ii) $y = \frac{1}{x} + 5$

On each sketch show the coordinates of any point at which the graph crosses the y -axis and the equation of any horizontal asymptote.

(4)

Given that $y = -3x + c$, where c is a positive constant, meets the curve $y = \frac{1}{x} + 5$ at two distinct points,

(b) show that $(5 - c)^2 > 12$

(3)

(c) Hence find the range of possible values for c .

(4)

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Question 9 continued

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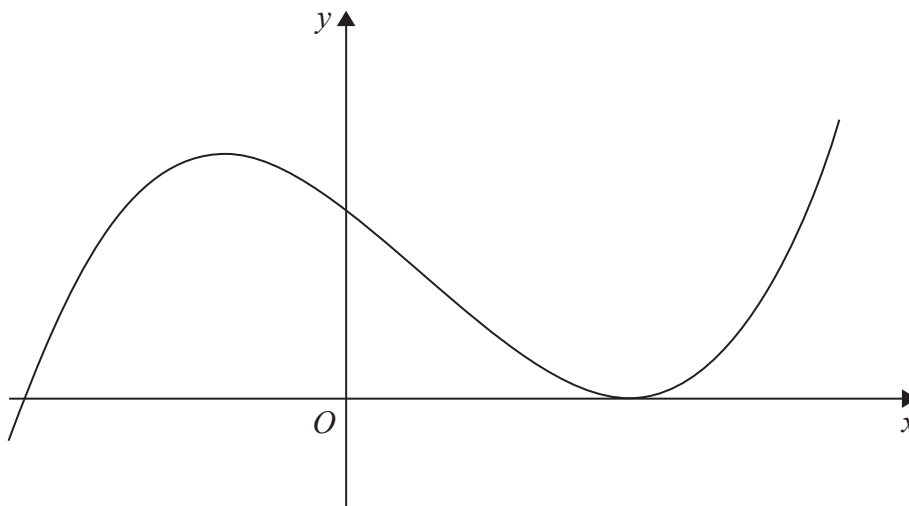


Figure 2

Figure 2 shows a sketch of part of the curve $y = f(x)$, $x \in \mathbb{R}$, where

$$f(x) = (2x - 5)^2(x + 3)$$

(a) Given that

- (i) the curve with equation $y = f(x) - k$, $x \in \mathbb{R}$, passes through the origin, find the value of the constant k ,
- (ii) the curve with equation $y = f(x + c)$, $x \in \mathbb{R}$, has a minimum point at the origin, find the value of the constant c .

(3)

(b) Show that $f'(x) = 12x^2 - 16x - 35$

(3)

Points A and B are distinct points that lie on the curve $y = f(x)$.

The gradient of the curve at A is equal to the gradient of the curve at B .

Given that point A has x coordinate 3

(c) find the x coordinate of point B .

(5)

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Question 10 continued

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Question 10 continued

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Q10

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(Total 11 marks)

TOTAL FOR PAPER: 75 MARKS

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