Write your name here

Surname	Other names

Pearson Edexcel GCE

Centre Number	Candidate Number

Core Mathematics C2

Advanced Subsidiary

Wednesday 23 May 2018 – Morning
Time: 1 hour 30 minutes

Paper Reference
6664/01

You must have:
Mathematical Formulae and Statistical Tables (Pink)

Total Marks

Candidates may use any calculator allowed by the regulations of the Joint Council for Qualifications. Calculators must not have the facility for symbolic algebra manipulation, differentiation and integration, or have retrievable mathematical formulae stored in them.

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.
- When a calculator is used, the answer should be given to an appropriate degree of accuracy.

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.

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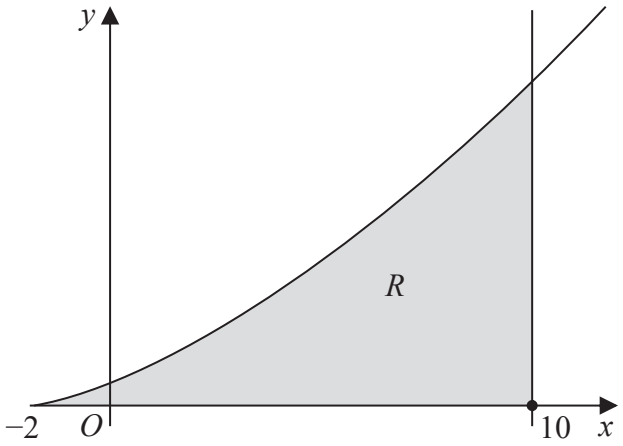


Figure 1

Figure 1 shows a sketch of part of the curve with equation

$$y = \frac{(x+2)^{\frac{3}{2}}}{4}, \qquad x \geqslant -2$$

The finite region R, shown shaded in Figure 1, is bounded by the curve, the x-axis and the line with equation $x = 10$

The table below shows corresponding values of x and y for $y = \frac{(x+2)^{\frac{3}{2}}}{4}$

(a) Complete the table, giving values of y corresponding to $x = 2$ and $x = 6$

x	−2	2	6	10
y	0			$6\sqrt{3}$

(1)

(b) Use the trapezium rule, with all the values of y from the completed table, to find an approximate value for the area of R, giving your answer to 3 decimal places.

(4)

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Question 1 continued

Q1

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2. (a) Find the first 4 terms, in ascending powers of x, of the binomial expansion of

$$(2 + kx)^7$$

where k is a non-zero constant. Give each term in its simplest form.

(4)

Given that the coefficient of x^3 in this expansion is 1890

(b) find the value of k.

(3)

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Question 2 continued

Q2

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3. $f(x) = 24x^3 + Ax^2 - 3x + B$

where A and B are constants.

When $f(x)$ is divided by $(2x - 1)$ the remainder is 30

(a) Show that $A + 4B = 114$

(2)

Given also that $(x + 1)$ is a factor of $f(x)$,

(b) find another equation in A and B.

(2)

(c) Find the value of A and the value of B.

(2)

(d) Hence find a quadratic factor of $f(x)$.

(2)

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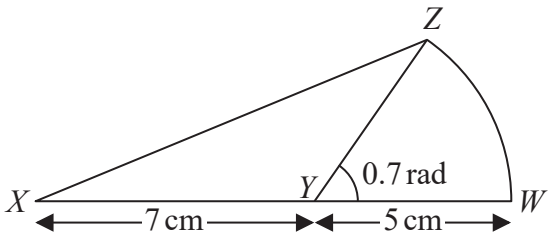
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Q3

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4.



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Figure 2

Figure 2 shows a flag *XYWZX*.

The flag consists of a triangle *XYZ* joined to a sector *ZYW* of a circle with radius 5 cm and centre *Y*.

The angle of the sector, angle *ZYW*, is 0.7 radians.

The points *X*, *Y* and *W* lie on a straight line with $XY = 7$ cm and $YW = 5$ cm.

Find

(a) the area of the sector *ZYW* in cm^2,

(2)

(b) the area of the flag, in cm^2, to 2 decimal places,

(3)

(c) the length of the perimeter, *XYWZX*, of the flag, in cm to 2 decimal places.

(4)

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Question 4 continued

Q4

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5. The circle C has equation

$$x^2 + y^2 - 2x + 14y = 0$$

Find

(a) the coordinates of the centre of C,

(2)

(b) the exact value of the radius of C,

(2)

(c) the y coordinates of the points where the circle C crosses the y-axis.

(2)

(d) Find an equation of the tangent to C at the point $(2, 0)$, giving your answer in the form $ax + by + c = 0$, where a, b and c are integers.

(4)

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Question 5 continued

Q5

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6. A geometric series with common ratio $r = -0.9$ has sum to infinity 10 000

For this series,

(a) find the first term,

(2)

(b) find the fifth term,

(2)

(c) find the sum of the first twelve terms, giving this answer to the nearest integer.

(3)

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Question 6 continued

Q6

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7. (i) Find the value of y for which

$$1.01^{y-1} = 500$$

Give your answer to 2 decimal places.

(2)

(ii) Given that

$$2\log_4(3x + 5) = \log_4(3x + 8) + 1, \qquad x > -\frac{5}{3}$$

(a) show that

$$9x^2 + 18x - 7 = 0$$

(4)

(b) Hence solve the equation

$$2\log_4(3x + 5) = \log_4(3x + 8) + 1, \qquad x > -\frac{5}{3}$$

(2)

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Question 7 continued

Q7

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8 *In this question solutions based entirely on graphical or numerical methods are not acceptable.*

(i) Solve for $0 \leqslant x < 360°$,

$$4\cos(x + 70°) = 3$$

giving your answers in degrees to one decimal place.

(4)

(ii) Find, for $0 \leqslant \theta < 2\pi$, all the solutions of

$$6\cos^2\theta - 5 = 6\sin^2\theta + \sin\theta$$

giving your answers in radians to 3 significant figures.

(5)

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Question 8 continued

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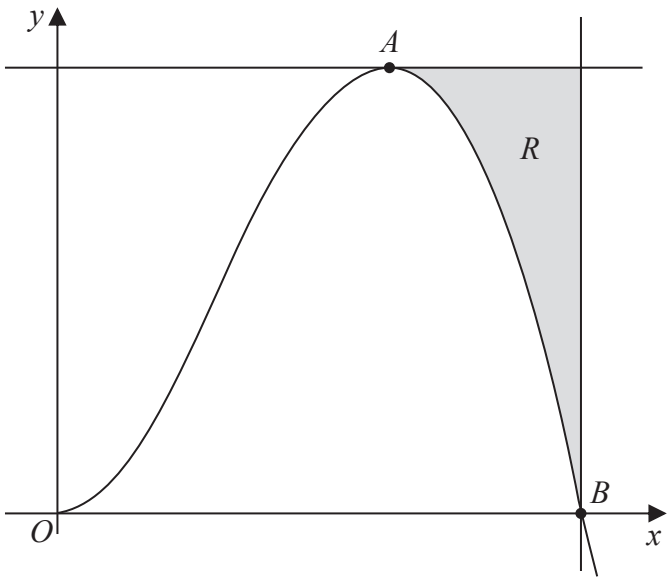


Figure 3

Figure 3 shows a sketch of part of the curve with equation

$$y = 7x^2(5 - 2\sqrt{x}), \qquad x \geqslant 0$$

The curve has a turning point at the point A, where $x > 0$, as shown in Figure 3.

(a) Using calculus, find the coordinates of the point A.

(5)

The curve crosses the x-axis at the point B, as shown in Figure 3.

(b) Use algebra to find the x coordinate of the point B.

(2)

The finite region R, shown shaded in Figure 3, is bounded by the curve, the line through A parallel to the x-axis and the line through B parallel to the y-axis.

(c) Use integration to find the area of the region R, giving your answer to 2 decimal places.

(5)

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TOTAL FOR PAPER: 75 MARKS

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