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Core Mathematics C2 For Edexcel Advanced Subsidiary

Paper L

Time: 1 hour 30 minutes

Instructions and Information

Candidates may use any calculator EXCEPT those with the facility for symbolic algebra, differentiation and/or integration.

Full marks may be obtained for answers to ALL questions.

The booklet 'Mathematical Formulae and Statistical Tables', available from Edexcel, may be used.

Advice to Candidates

You must show sufficient working to make your methods clear to an examiner.
Answers without working may gain no credit.

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1. (*a*) Expand $(1 + y)^5$ in ascending powers of y as far as the term in y^3.

(3)

(*b*) Show that the first four terms in the expansion of $(1 + x + 2x^2)^5$, in ascending powers of x, are $1 + 5x + 20x^2 + 50x^3$.

(4)

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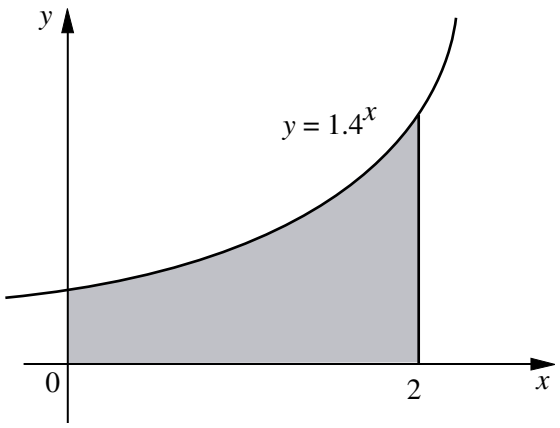
2. Solve, for $0 \leq x \leq 360°$, the equation

$$4 \sin^2 x + 5 \cos x = 5$$

giving your answers to 1 decimal place, where appropriate.

(7)

3.



The diagram shows the curve $y = 1.4^x$.

(*a*) Use the trapezium rule with 4 intervals to estimate to 3 significant figures the area of the shaded region, bounded by the curve, the axes, and the line is $x = 2$.

(5)

(*b*) State, with a reason, whether the estimate found in (a) is larger or smaller than the exact area.

(2)

(*c*) Explain how you could use the trapezium rule to obtain a more accurate estimate of the area.

(1)

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4. Given that $\log_2 x = a$ and $\log_2 y = b$, find in terms of a and b,

(*a*) $\log_2(xy^2)$,

(2)

(*b*) $\log_2\left(\frac{x^3}{y}\right)$.

(2)

Given that $\log_2(xy^2) = 0$ and that $\log_2\left(\frac{x^3}{y}\right) = 1$,

(*c*) form simultaneous equations in a and b,

(2)

(*d*) Find the value of a and the value of b.

(3)

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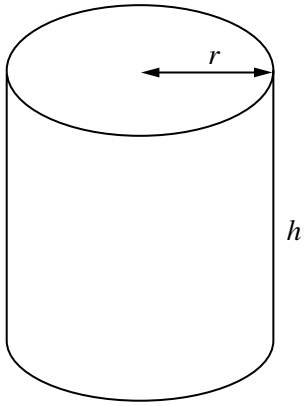
5.



The diagram shows a solid cylinder of height h cm and radius r cm. The volume of the cylinder is 128π cm^3.

(a) Express h in terms of r.

(1)

(b) Write down an expression for the total surface area A of the cylinder, in terms of r and h.

(2)

(c) Show that $A = 2\pi\left(r^2 + \frac{128}{r}\right)$.

(3)

(d) Find the minimum possible value of A.

(5)

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6. The points P and Q have coordinates $(1, 6)$ and $(13, 4)$ respectively. The point O is the origin.

(a) Find an equation for the straight line PQ in the form $ax + by = c$, where a, b and c are integers.

(2)

(b) Show that the lines OP and PQ are perpendicular.

(2)

(c) A circle passes through the points O, P and Q.

(2)

(i) Explain briefly why OQ is a diameter.

(1)

(ii) Write down the coordinates of the centre of the circle.

(1)

(d) Find an equation for the circle.

(3)

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7.

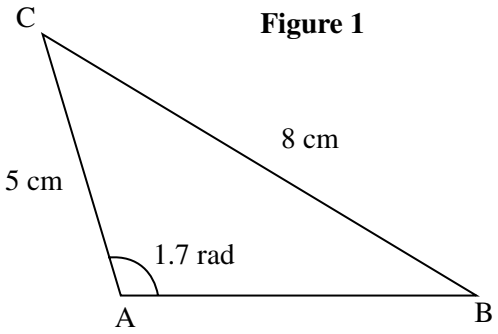

Figure 1

Figure 1 shows triangle ABC, in which $AC = 5\,\text{cm}$, $BC = 8\,\text{cm}$ and angle $BAC = 1.7$ radians.

Find the following, giving answers to 2 decimal places,

(a) angle ABC, giving your answer in radians,

(2)

(b) the area of triangle ABC,

(4)

An arc of a circle with centre C and radius 5 cm is drawn, cutting BC at the point D.

(c) Find the perimeter and area of the sector CAD

(4)

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8. The first three terms of a geometric series are x^2, $(x + 4)$ and $(2x - 4)$ respectively.

(a) Form an equation involving x and show that it simplifies to the equation $2x^3 - 5x^2 - 8x - 16 = 0$.

(3)

(b) Show that $x = 4$ is a solution of the equation in (a) and determine whether there are any other real solutions.

(6)

(c) Find the first term and common ratio of the series.

(2)

(d) Find the sum to infinity of the series.

(1)

END **TOTAL 75 MARKS**