

**Edexcel GCE  
Core Mathematics C2  
Gold Level G2  
(Question Paper)**

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Paper Reference(s)

**6664/01**

# **Edexcel GCE**

## **Core Mathematics C2**

### **Gold Level G2**

**Time: 1 hour 30 minutes**

**Materials required for examination papers**

Mathematical Formulae (Green)

**Items included with question**

Nil

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 formulas stored in them.

#### **Instructions to Candidates**

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Write the name of the examining body (Edexcel), your centre number, candidate number, the unit title (Core Mathematics C2), the paper reference (6664), your surname, initials and signature.

#### **Information for Candidates**

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A booklet 'Mathematical Formulae and Statistical Tables' is provided.

Full marks may be obtained for answers to ALL questions.

There are 9 questions in this question paper. The total mark for this paper is 75.

#### **Advice to Candidates**

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You must ensure that your answers to parts of questions are clearly labelled.

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

#### **Suggested grade boundaries for this paper:**

<b>A*</b>	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>E</b>
<b>64</b>	<b>56</b>	<b>48</b>	<b>40</b>	<b>32</b>	<b>24</b>

1.  $f(x) = 2x^3 - 3x^2 - 39x + 20$

(a) Use the factor theorem to show that  $(x + 4)$  is a factor of  $f(x)$ . (2)

(b) Factorise  $f(x)$  completely. (4)

**June 2008**

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2.  $y = \frac{x}{\sqrt{1+x}}$

(a) Complete the table below with the value of  $y$  corresponding to  $x = 1.3$ , giving your answer to 4 decimal places. (1)

$x$	1	1.1	1.2	1.3	1.4	1.5
$y$	0.7071	0.7591	0.8090		0.9037	0.9487

(b) Use the trapezium rule, with all the values of  $y$  in the completed table, to obtain an approximate value for

$$\int_1^{1.5} \frac{x}{\sqrt{1+x}} dx$$

giving your answer to 3 decimal places.

You must show clearly each stage of your working.

(4)

**May 2013 (R)**

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3.  $y = x^2 - k\sqrt{x}$ , where  $k$  is a constant.

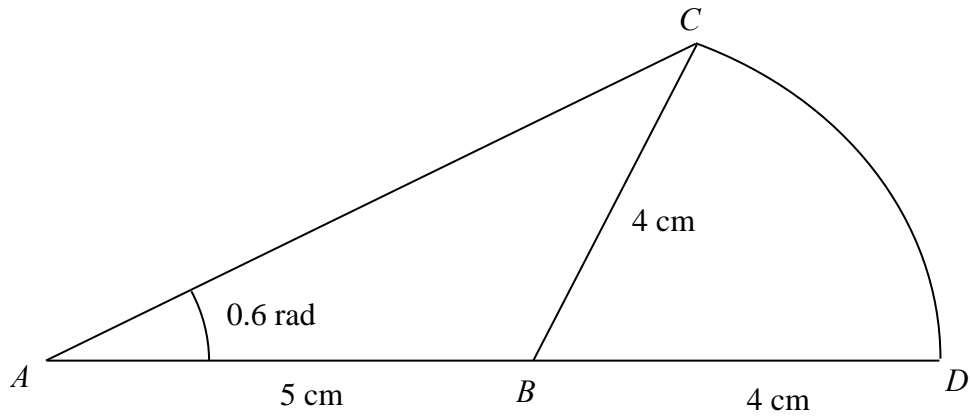
(a) Find  $\frac{dy}{dx}$ . (2)

(b) Given that  $y$  is decreasing at  $x = 4$ , find the set of possible values of  $k$ . (2)

**June 2010**

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4.



**Figure 1**

An emblem, as shown in Figure 1, consists of a triangle  $ABC$  joined to a sector  $CBD$  of a circle with radius 4 cm and centre  $B$ . The points  $A$ ,  $B$  and  $D$  lie on a straight line with  $AB = 5$  cm and  $BD = 4$  cm. Angle  $BAC = 0.6$  radians and  $AC$  is the longest side of the triangle  $ABC$ .

(a) Show that angle  $ABC = 1.76$  radians, correct to three significant figures.

(4)

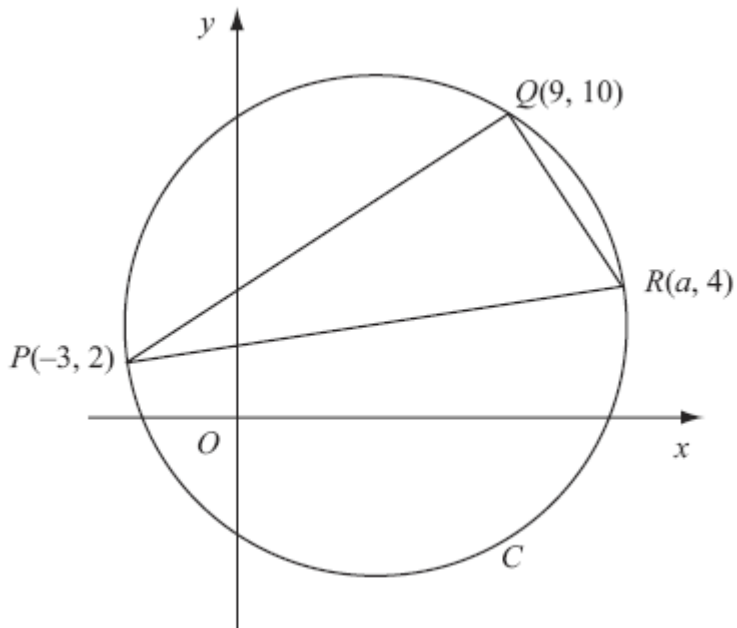
(b) Find the area of the emblem.

(3)

**January 2010**

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5.



**Figure 2**

The points  $P(-3, 2)$ ,  $Q(9, 10)$  and  $R(a, 4)$  lie on the circle  $C$ , as shown in Figure 2.

Given that  $PR$  is a diameter of  $C$ ,

(a) show that  $a = 13$ ,

**(3)**

(b) find an equation for  $C$ .

**(5)**

**January 2009**

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6. Given that  $\log_3 x = a$ , find in terms of  $a$ ,

(a)  $\log_3 (9x)$

**(2)**

(b)  $\log_3 \left( \frac{x^5}{81} \right)$

**(3)**

giving each answer in its simplest form.

(c) Solve, for  $x$ ,

$$\log_3 (9x) + \log_3 \left( \frac{x^5}{81} \right) = 3$$

giving your answer to 4 significant figures.

**(4)**

**May 2013 (R)**

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7. (i) Solve, for  $-180^\circ \leq x < 180^\circ$ ,

$$\tan(x - 40^\circ) = 1.5,$$

giving your answers to 1 decimal place.

**(3)**

- (ii) (a) Show that the equation

$$\sin \theta \tan \theta = 3 \cos \theta + 2$$

can be written in the form

$$4 \cos^2 \theta + 2 \cos \theta - 1 = 0.$$

**(3)**

- (b) Hence solve, for  $0 \leq \theta < 360^\circ$ ,

$$\sin \theta \tan \theta = 3 \cos \theta + 2,$$

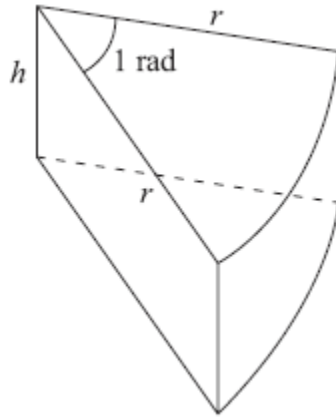
showing each stage of your working.

**(5)**

**May 2013**

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8.



**Figure 3**

Figure 3 shows a closed box used by a shop for packing pieces of cake. The box is a right prism of height  $h$  cm. The cross section is a sector of a circle. The sector has radius  $r$  cm and angle 1 radian.

The volume of the box is  $300 \text{ cm}^3$ .

(a) Show that the surface area of the box,  $S \text{ cm}^2$ , is given by

$$S = r^2 + \frac{1800}{r}. \quad (5)$$

(b) Use calculus to find the value of  $r$  for which  $S$  is stationary. (4)

(c) Prove that this value of  $r$  gives a minimum value of  $S$ . (2)

(d) Find, to the nearest  $\text{cm}^2$ , this minimum value of  $S$ . (2)

**June 2009**

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9. A solid right circular cylinder has radius  $r$  cm and height  $h$  cm.

The total surface area of the cylinder is  $800 \text{ cm}^2$ .

(a) Show that the volume,  $V \text{ cm}^3$ , of the cylinder is given by

$$V = 400r - \pi r^3. \quad (4)$$

Given that  $r$  varies,

(b) use calculus to find the maximum value of  $V$ , to the nearest  $\text{cm}^3$ . (6)

(c) Justify that the value of  $V$  you have found is a maximum. (2)

**January 2009**

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**TOTAL FOR PAPER: 75 MARKS**

**END**