

**Edexcel GCE**  
**Core Mathematics C2**  
**Practice Paper A7**  
**(Question Paper)**

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1.

$$f(x) = 4x^3 + 3x^2 - 2x - 6.$$

Find the remainder when  $f(x)$  is divided by  $(2x + 1)$ .

**(3 marks)**

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2. The point  $A$  has coordinates  $(2, 5)$  and the point  $B$  has coordinates  $(-2, 8)$ .

Find, in cartesian form, an equation of the circle with diameter  $AB$ .

**(4 marks)**

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3.

$$f(x) = x^3 - 19x - 30.$$

(a) Show that  $(x + 2)$  is a factor of  $f(x)$ .

**(2 marks)**

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

**(4 marks)**

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4. Express  $\frac{3}{x^2 + 2x} + \frac{x-4}{x^2 - 4}$  as a single fraction in its simplest form.

**(7 marks)**

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5. Find, in degrees, the value of  $\theta$  in the interval  $0 \leq \theta < 360^\circ$  for which

$$2\cos^2\theta - \cos\theta - 1 = \sin^2\theta.$$

Give your answers to 1 decimal place where appropriate.

**(8 marks)**

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6. A geometric series is  $a + ar + ar^2 + \dots$

(a) Prove that the sum of the first  $n$  terms of this series is given by

$$S_n = \frac{a(1 - r^n)}{1 - r}. \quad \text{(4 marks)}$$

The second and fourth terms of the series are 3 and 1.08 respectively.

Given that all terms in the series are positive, find

(b) the value of  $r$  and the value of  $a$ ,

**(5 marks)**

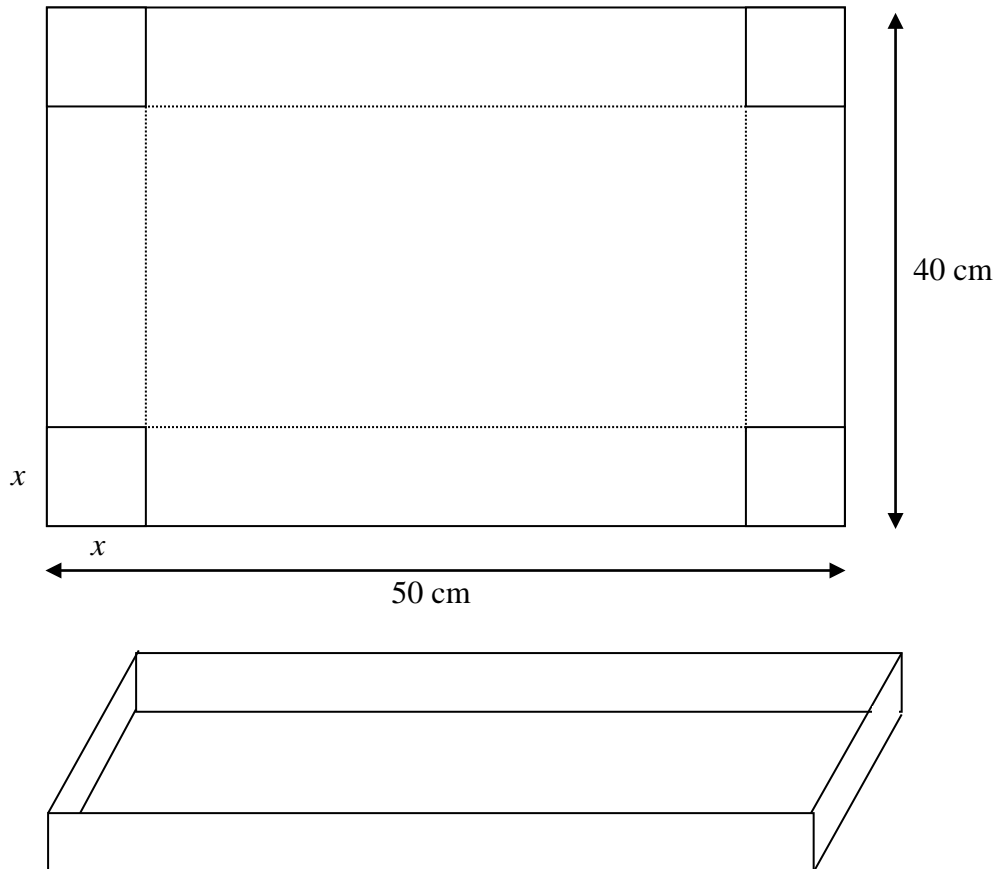
(c) the sum to infinity of the series.

**(3 marks)**

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7..

Figure 2



A rectangular sheet of metal measures 50 cm by 40 cm. Squares of side  $x$  cm are cut from each corner of the sheet and the remainder is folded along the dotted lines to make an open tray, as shown in Fig. 2.

(a) Show that the volume,  $V$  cm<sup>3</sup>, of the tray is given by

$$V = 4x(x^2 - 45x + 500). \quad \text{(3 marks)}$$

(b) State the range of possible values of  $x$ . (1 marks)

(c) Find the value of  $x$  for which  $V$  is a maximum. (4 marks)

(d) Hence find the maximum value of  $V$ . (2 marks)

(e) Justify that the value of  $V$  you found in part (d) is a maximum. (2 marks)

8.

Figure 1

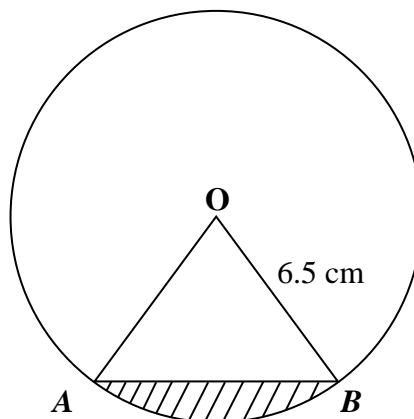


Figure 1 shows the sector  $AOB$  of a circle, with centre  $O$  and radius 6.5 cm, and  $\angle AOB = 0.8$  radians.

(a) Calculate, in  $\text{cm}^2$ , the area of the sector  $AOB$ . **(2 marks)**

(b) Show that the length of the chord  $AB$  is 5.06 cm, to 3 significant figures. **(3 marks)**

The segment  $R$ , shaded in Fig. 1, is enclosed by the arc  $AB$  and the straight line  $AB$ .

(c) Calculate, in cm, the perimeter of  $R$ . **(2 marks)**

9.

Figure 2

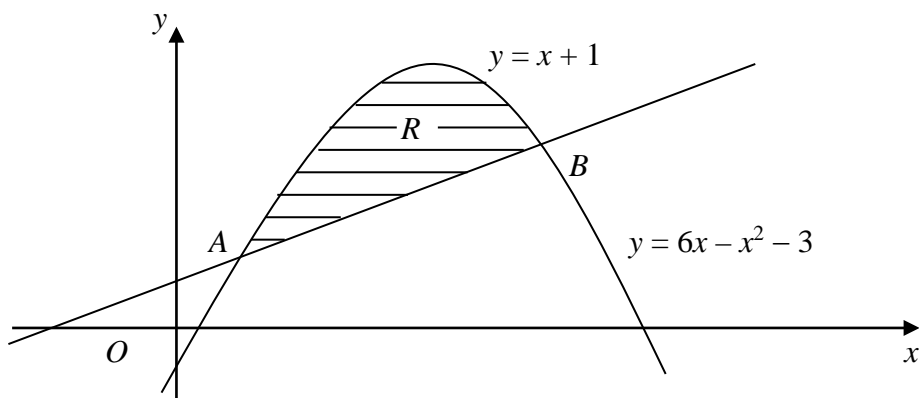


Figure 2 shows the line with equation  $y = x + 1$  and the curve with equation  $y = 6x - x^2 - 3$ .

The line and the curve intersect at the points  $A$  and  $B$ , and  $O$  is the origin.

(a) Calculate the coordinates of  $A$  and the coordinates of  $B$ . (5 marks)

The shaded region  $R$  is bounded by the line and the curve.

(b) Calculate the area of  $R$ . (7 marks)

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**END**