

Paper Reference (complete below)										Centre No.					
	6	6	6	3	/	0	1			Candidate No.					

Surname	Initial(s)
Signature	

Paper Reference(s)

**6663**

**Edexcel GCE**  
**Core Mathematics C2**  
**Advanced Subsidiary**  
**Set A: Practice Paper 7**

Time: 1 hour 30 minutes

Materials required for examination  
 Mathematical Formulae

Items included with question papers  
 Nil

**Candidates may use any calculator EXCEPT those with the facility for symbolic algebra, differentiation and/or integration. Thus candidates may NOT use calculators such as the Texas Instruments TI-89, TI-92, Casio *cfx* 9970G, Hewlett Packard HP 48G.**

**Instructions to Candidates**

In the boxes above, write your centre number, candidate number, your surname, initials and signature. You must write your answer for each question in the space following the question. If you need more space to complete your answer to any question, use additional answer sheets.

**Information for Candidates**

A booklet 'Mathematical Formulae and Statistical Tables' is provided.  
 Full marks may be obtained for answers to ALL questions.  
 This paper has nine questions.

**Advice to Candidates**

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.

Examiner's use only

--	--	--

Team Leader's use only

--	--	--

Question Number	Leave Blank
1	
2	
3	
4	
5	
6	
7	
Total	

*Turn over*

1.

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

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

**(3 marks)**

---

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)**

---

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)**

---

4. Express  $\frac{3}{x^2 + 2x} + \frac{x-4}{x^2 - 4}$  as a single fraction in its simplest form.**(7 marks)**

---

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)**

---

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)**

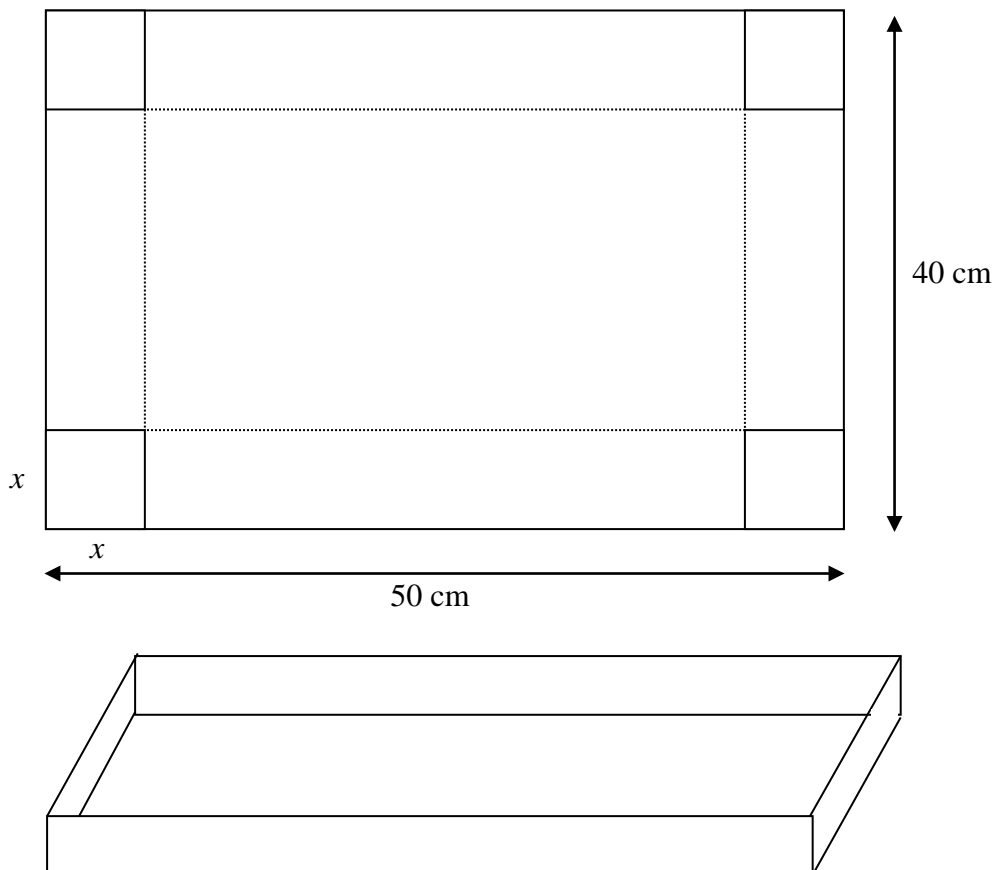
(c) the sum to infinity of the series.

**(3 marks)**

---

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

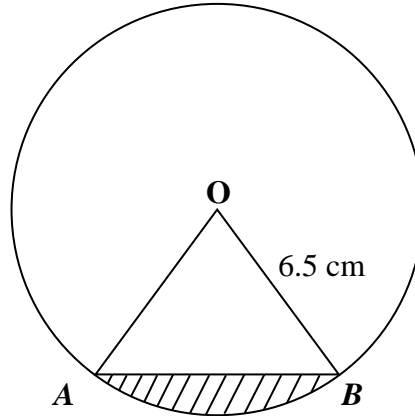


Figure 1 shows the sector  $AOB$  of a circle, with centre  $O$  and radius 6.5 cm, and  $\angle AOB = 0.8$  radians.

(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

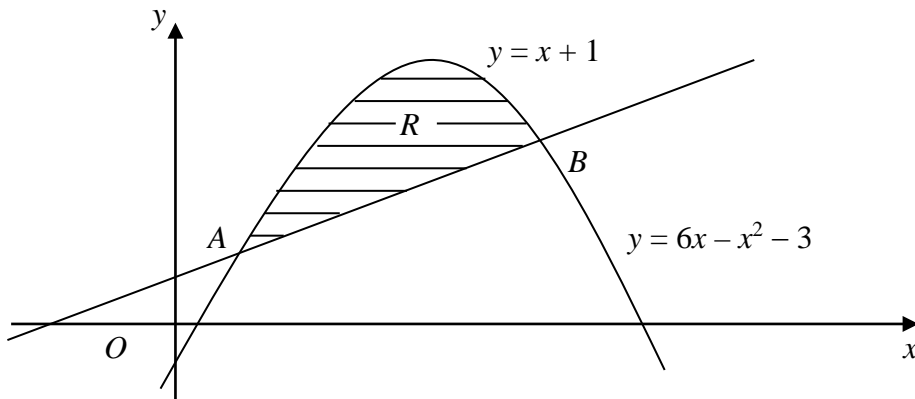


Figure 2 shows the line with equation  $y = x + 1$  and the curve with equation  $y = 6x - x^2 - 3$ .

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)

**END**