

**Edexcel GCE**  
**Core Mathematics C1**  
**Practice Paper B1**  
**(Question Paper)**

**All exam papers are issued free to students for education purpose only.  
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**6663**

**Edexcel GCE**  
**Core Mathematics C1**  
**Advanced Subsidiary**  
**Set B: Practice Question Paper 1**

Time: 1 hour 30 minutes

**Materials required for examination**

Mathematical Formulae

**Items included with question papers**

Nil

Calculators may NOT be used in this examination.

**Instructions to Candidates**

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

**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 10 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.

1. (a) Given that  $8 = 2^k$ , write down the value of  $k$ . (1)  
(b) Given that  $4^x = 8^{2-x}$ , find the value of  $x$ . (4)

[P1 June 2001 Question 1]

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2. Given that  $(2 + \sqrt{7})(4 - \sqrt{7}) = a + b\sqrt{7}$ , where  $a$  and  $b$  are integers,  
(a) find the value of  $a$  and the value of  $b$ . (2)

Given that  $\frac{2 + \sqrt{7}}{4 + \sqrt{7}} = c + d\sqrt{7}$  where  $c$  and  $d$  are rational numbers,

- (b) find the value of  $c$  and the value of  $d$ . (3)

[P1 January 2001 Question 1]

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3. (a) Solve the inequality  $3x - 8 > x + 13$ . (2)  
(b) Solve the inequality  $x^2 - 5x - 14 > 0$ . (3)

[P1 November 2002 Question 1]

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4. (a) Prove, by completing the square, that the roots of the equation  $x^2 + 2kx + c = 0$ , where  $k$  and  $c$  are constants, are  $-k \pm \sqrt{k^2 - c}$ . (4)

The equation  $x^2 + 2kx \pm 81 = 0$  has equal roots.

- (b) Find the possible values of  $k$ . (2)

[P1 January 2001 Question 2]

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5. Solve the simultaneous equations  $x - 3y + 1 = 0$ ,  $x^2 - 3xy + y^2 = 11$ . (7)

[P1 November 2003 Question 3]

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6. 
$$\frac{dy}{dx} = 5 + \frac{1}{x^2}.$$
  
(a) Use integration to find  $y$  in terms of  $x$ . (3)  
(b) Given that  $y = 7$  when  $x = 1$ , find the value of  $y$  at  $x = 2$ . (4)

[P1 June 2003 Question 1]

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7. Each year, for 40 years, Anne will pay money into a savings scheme. In the first year she pays £500. Her payments then increase by £50 each year, so that she pays £550 in the second year, £600 in the third year, and so on.

- (a) Find the amount that Anne will pay in the 40th year. (2)

- (b) Find the total amount that Anne will pay in over the 40 years. (2)

Over the same 40 years, Brian will also pay money into the savings scheme. In the first year he pays in £890 and his payments then increase by £ $d$  each year.

Given that Brian and Anne will pay in exactly the same amount over the 40 years,

- (c) find the value of  $d$ . (4)

[P1 June 2001 Question 4]

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8. The points  $A$  and  $B$  have coordinates  $(4, 6)$  and  $(12, 2)$  respectively. The straight line  $l_1$  passes through  $A$  and  $B$ .
- (a) Find an equation for  $l_1$  in the form  $ax + by = c$ , where  $a$ ,  $b$  and  $c$  are integers. (4)
- The straight line  $l_2$  passes through the origin and has gradient  $-4$ .
- (b) Write down an equation for  $l_2$ . (1)
- The lines  $l_1$  and  $l_2$  intersect at the point  $C$ .
- (c) Find the exact coordinates of the mid-point of  $AC$ . (5)

[P1 June 2003 Question 6]

9. A curve  $C$  has equation  $y = x^3 - 5x^2 + 5x + 2$ .
- (a) Find  $\frac{dy}{dx}$  in terms of  $x$ . (2)
- The points  $P$  and  $Q$  lie on  $C$ . The gradient of  $C$  at both  $P$  and  $Q$  is 2. The  $x$ -coordinate of  $P$  is 3.
- (b) Find the  $x$ -coordinate of  $Q$ . (2)
- (c) Find an equation for the tangent to  $C$  at  $P$ , giving your answer in the form  $y = mx + c$ , where  $m$  and  $c$  are constants. (3)
- This tangent intersects the coordinate axes at the points  $R$  and  $S$ .
- (d) Find the length of  $RS$ , giving your answer as a surd. (4)

[P1 January 2002 Question 5]

10.

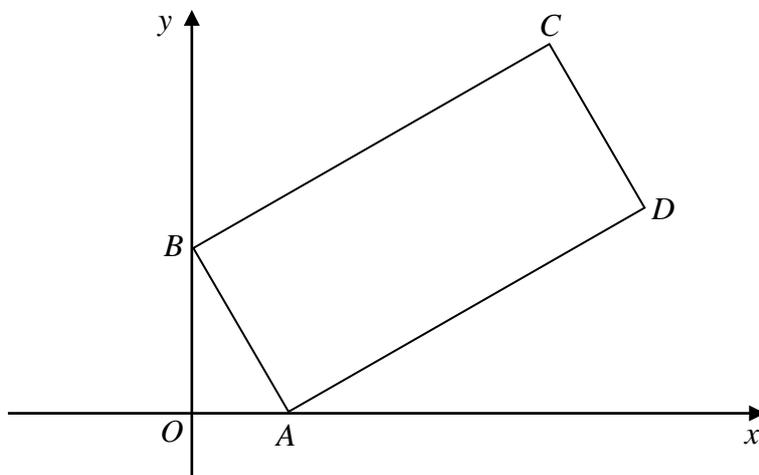


Figure 1

- The points  $A(3, 0)$  and  $B(0, 4)$  are two vertices of the rectangle  $ABCD$ , as shown in Fig. 1.
- (a) Write down the gradient of  $AB$  and hence the gradient of  $BC$ . (3)
- The point  $C$  has coordinates  $(8, k)$ , where  $k$  is a positive constant.
- (b) Find the length of  $BC$  in terms of  $k$ . (2)
- Given that the length of  $BC$  is 10 and using your answer to part (b),
- (c) find the value of  $k$ , (4)
- (d) find the coordinates of  $D$ . (2)

[P1 January 2001 Question 6]