Paper Reference(s)

6663

Edexcel GCE

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

Time: 1 hour 30 minutes

Materials required for examination   **Items included with question papers**
Mathematical Formulae   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.

Edexcel
Success through qualifications

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]

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 $\dfrac{2 + \sqrt{7}}{4 + \sqrt{7}} = c + d\sqrt{7}$ where *c* and *d* are rational numbers,

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

    [P1 January 2001 Question 1]

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]

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]

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

    [P1 November 2003 Question 3]

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]

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]

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 intercept 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 $\dfrac{dy}{dx}$ 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)**
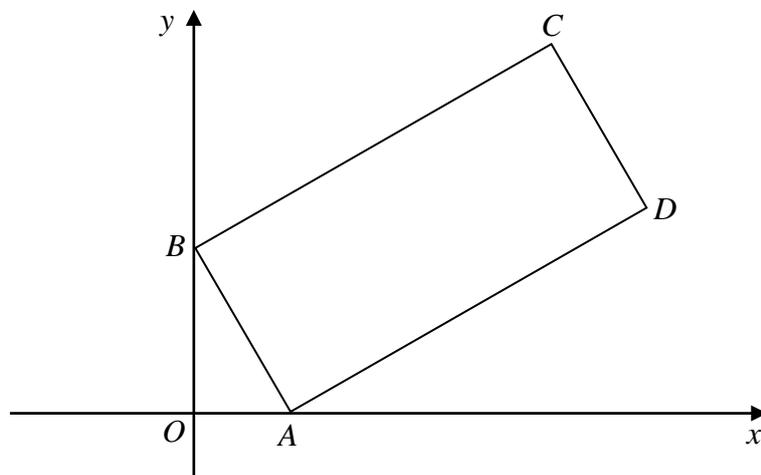
[P1 January 2002 Question 5]

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]