

Paper Reference(s)

6663

Edexcel GCE

Core Mathematics C1

Advanced Subsidiary

Set B: Practice Question Paper 2

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 9 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. Given that $2^x = \frac{1}{\sqrt{2}}$ and $2^y = 4\sqrt{2}$,

(a) find the exact value of x and the exact value of y , (3)

(b) calculate the exact value of 2^{y-x} . (2)

[P1 January 2002 Question 1]

2.
$$f(x) = \frac{(x^2 - 3)^2}{x^3}, x \neq 0.$$

(a) Show that $f(x) \equiv x - 6x^{-1} + 9x^{-3}$. (2)

(b) Hence, or otherwise, differentiate $f(x)$ with respect to x . (3)

[P1 June 2004 Question 6*]

3. The sum of an arithmetic series is $\sum_{r=1}^n (80 - 3r)$.

(a) Write down the first two terms of the series. (2)

(b) Find the common difference of the series. (1)

Given that $n = 50$,

(c) find the sum of the series. (3)

[P1 November 2003 Question 1]

4. Find the set of values for x for which

(a) $6x - 7 < 2x + 3$, (2)

(b) $2x^2 - 11x + 5 < 0$, (4)

(c) both $6x - 7 < 2x + 3$ and $2x^2 - 11x + 5 < 0$. (1)

[P1 June 2003 Question 2]

5. The equation $x^2 + 5kx + 2k = 0$, where k is a constant, has real roots.

(a) Prove that $k(25k - 8) \geq 0$. (2)

(b) Hence find the set of possible values of k . (4)

(c) Write down the values of k for which the equation $x^2 + 5kx + 2k = 0$ has equal roots. (1)

[P1 June 2001 Question 3]

6. Initially the number of fish in a lake is 500 000. The population is then modelled by the recurrence relation $u_{n+1} = 1.05u_n - d$, $u_0 = 500\,000$.

In this relation u_n is the number of fish in the lake after n years and d is the number of fish which are caught each year.

Given that $d = 15\,000$,

- (a) calculate u_1 , u_2 and u_3 and comment briefly on your results. (3)

Given that $d = 100\,000$,

- (b) show that the population of fish dies out during the sixth year. (3)

- (c) Find the value of d which would leave the population each year unchanged. (2)

[P2 January 2002 Question 5]

7.

Figure 1

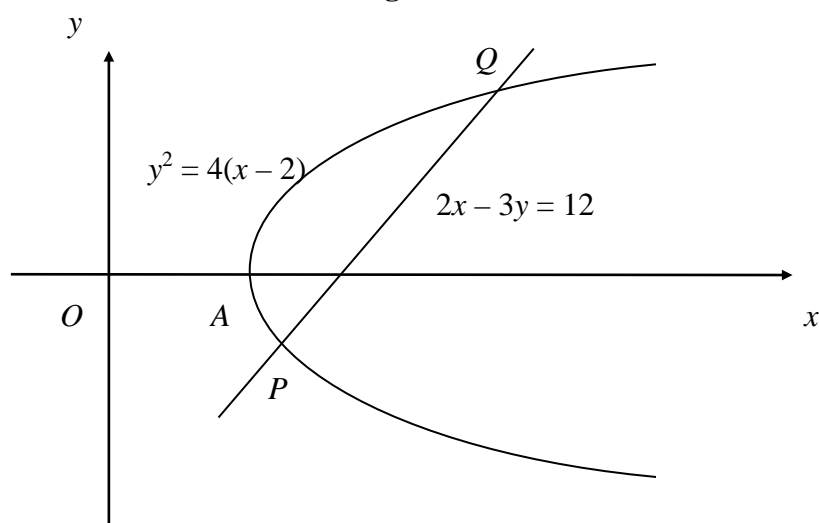


Fig. 1 shows the curve with equation $y^2 = 4(x - 2)$ and the line with equation $2x - 3y = 12$.

The curve crosses the x -axis at the point A , and the line intersects the curve at the points P and Q .

- (a) Write down the coordinates of A . (1)
- (b) Find, using algebra, the coordinates of P and Q . (6)
- (c) Show that $\angle PAQ$ is a right angle. (4)

[P1 January 2004 Question 6]

8. The points $A(-1, -2)$, $B(7, 2)$ and $C(k, 4)$, where k is a constant, are the vertices of $\triangle ABC$. Angle ABC is a right angle.
- (a) Find the gradient of AB . (2)
 - (b) Calculate the value of k . (2)
 - (c) Show that the length of AB may be written in the form $p\sqrt{5}$, where p is an integer to be found. (3)
 - (d) Find the exact value of the area of $\triangle ABC$. (3)
 - (e) Find an equation for the straight line l passing through B and C . Give your answer in the form $ax + by + c = 0$, where a , b and c are integers. (2)

[P1 June 2001 Question 8*]

9. The curve C has equation $y = f(x)$. Given that $\frac{dy}{dx} = 3x^2 - 20x + 29$ and that C passes through the point $P(2, 6)$,
- (a) find y in terms of x . (4)
 - (b) Verify that C passes through the point $(4, 0)$. (2)
 - (c) Find an equation of the tangent to C at P . (3)
- The tangent to C at the point Q is parallel to the tangent at P .
- (d) Calculate the exact x -coordinate of Q . (5)

[P1 November 2002 Question 7]
