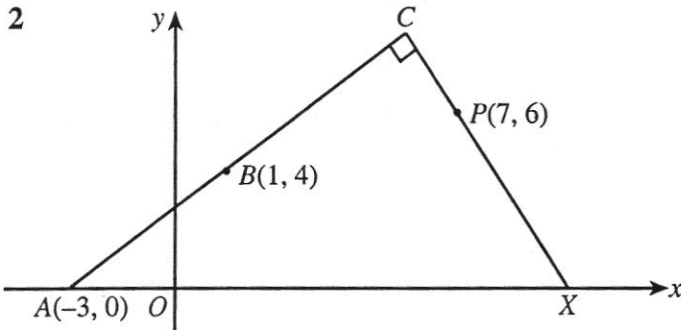


PAST YEARS EXAMINATION QUESTIONS

1 Find the equation of

- (i) the line through $A(-2, -4)$ and $B(3, 8)$,
- (ii) the line through B perpendicular to AB .

N2002/I/1 (AO Maths)



The diagram shows two perpendicular lines ABC and CPX . The points A , B and P have coordinates $(-3, 0)$, $(1, 4)$ and $(7, 6)$ respectively. The point X lies on the x -axis.

- (i) Find the coordinates of X and of C .

The perpendicular bisector of BP meets the x -axis at Y . Find

- (ii) the coordinates of Y ,
- (iii) the ratio of the length of CY to the length of CX , expressing your answer in the form $1 : n$, giving n to 2 decimal places.

N2002/I/14 (AO Maths)

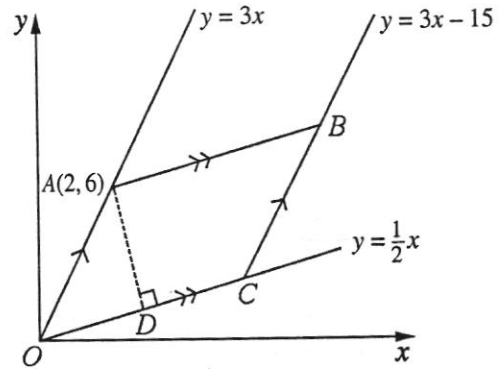
3 The line $2y = 3x - 6$ intersects the curve $xy = 12$ at the points P and Q . Find the equation of the perpendicular bisector of PQ . [8]

N2002/I/9

4 Find the equation of the straight line, perpendicular to the line $5y - 4x + 27 = 0$, which passes through the mid-point of the line joining the points $(5, 6)$ and $(7, -8)$.

N2003/I/6 (AO Maths)

5 Solutions to this question by accurate drawing will not be accepted.

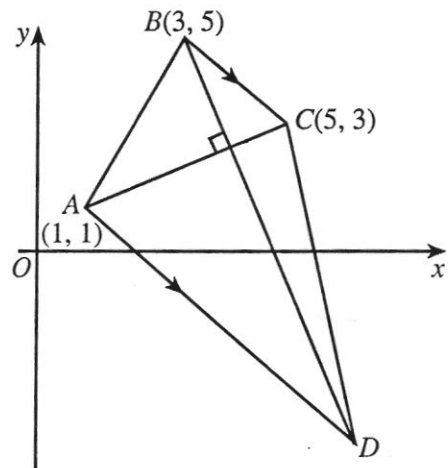


The diagram, which is not drawn to scale, shows a parallelogram $OABC$ where O is the origin and A is the point $(2, 6)$. The equations of OA , OC and CB are $y = 3x$, $y = \frac{1}{2}x$ and $y = 3x - 15$ respectively. The perpendicular from A to OC meets OC at the point D . Find

- (i) the coordinates of C , B and D , [8]
- (ii) the perimeter of the parallelogram $OABC$, correct to 1 decimal place. [3]

N2003/I/11

6 Solutions to this question by accurate drawing will not be accepted.



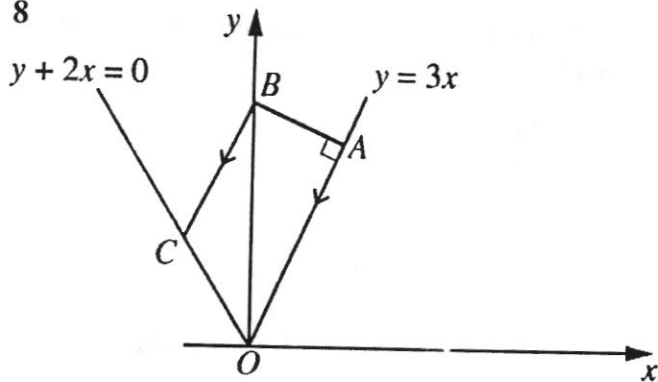
In the diagram the points A , B and C have coordinates $(1, 1)$, $(3, 5)$ and $(5, 3)$ respectively. The line through A parallel to BC meets the line through B perpendicular to AC at the point D . Find the area of the trapezium $ABCD$.

N2004/II/5 (AO Maths)

7 The line $4y = 3x + 1$ intersects the curve $xy = 28x - 27y$ at the point $P(1, 1)$ and at the point Q . The perpendicular bisector of PQ intersects the line $y = 4x$ at the point R . Calculate the area of triangle PQR . [9]

N2004/I/11

8

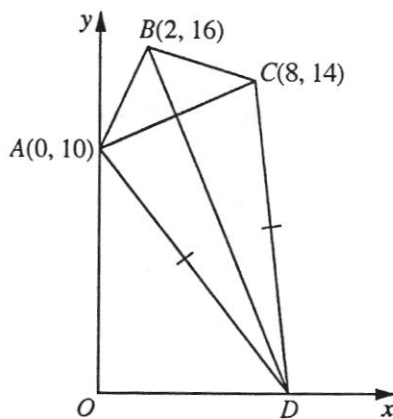


The diagram shows a trapezium $OABC$, where O is the origin. The equation of OA is $y = 3x$ and the equation of OC is $y + 2x = 0$. The line through A perpendicular to OA meets the y -axis at B and BC is parallel to AO . Given that the length of OA is $\sqrt{250}$ units, calculate the coordinates of A , of B and of C .

[10]

N2004/II/11

9 Solutions to this question by accurate drawing will not be accepted.



The diagram, which is not drawn to scale, shows a quadrilateral $ABCD$ in which A is $(0, 10)$, B is $(2, 16)$ and C is $(8, 14)$.

(i) Show that triangle ABC is isosceles. [2]

The point D lies on the x -axis and is such that $AD = CD$. Find

(ii) the coordinates of D , [4]

(iii) the ratio of the area of triangle ABC to the area of triangle ACD . [3]

N2005/II/10

10 The perpendicular bisector of the line joining $A(2, 1)$ and $B(6, 9)$ intersects the coordinate axes at the points P and Q . Find the ratio of the length AB to the length PQ , giving your answer in the form $1 : n$.

N2005/II/5 (AO Maths)

11 The line $x + y = 10$ meets the curve $y^2 = 2x + 4$ at the points A and B . Find the coordinates of the mid-point of AB . [5]

N2005/II/2

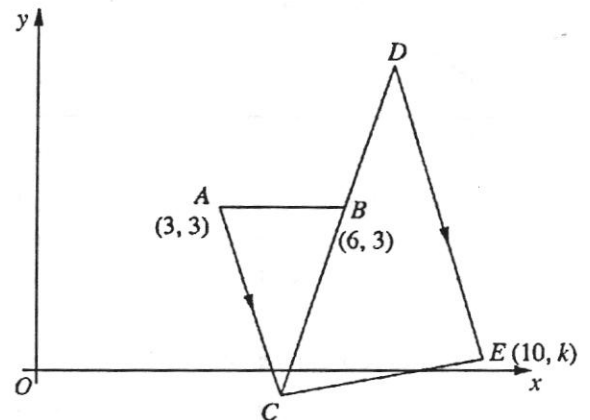
12 Find the equation of the perpendicular bisector of the line joining the points $A(-3, -7)$ and $B(7, 13)$.

N2006/II/5 (AO Maths)

13 The straight line $2x + y = 14$ intersects the curve $2x^2 - y^2 = 2xy - 6$ at the points A and B . Show that the length of AB is $24\sqrt{5}$ units. [7]

N2006/II/5

14 Solutions to this question by accurate drawing will not be accepted.



The diagram shows an isosceles triangle ABC in which A is the point $(3, 3)$, B is the point $(6, 3)$ and C lies below the x -axis. Given that the area of triangle ABC is 6 square units,

(i) find the coordinates of C . [3]

The line CB is extended to the point D so that B is the mid-point of CD .

(ii) Find the coordinates of D . [2]

A line is drawn from D , parallel to AC , to the point $E(10, k)$ and C is joined to E .

(iii) Find the value of k . [3]

(iv) Prove that angle CED is not a right angle. [2]

N2006/II/12 (OR)

15 Find the coordinates of the point where the perpendicular bisector of the line joining the points $A(12, -5)$ and $B(-4, 3)$ meets the x -axis.

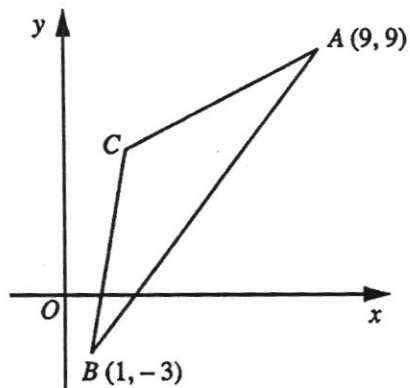
N2007/II/4 (AO Maths)

16 The line $2x + 3y = 12$ meets the curve $y^2 = 4x - 8$ at the points P and Q . Find the length of the line PQ .

[5]

N2007/II/3

17 Solutions to this question by accurate drawing will not be accepted.



The diagram, which is not drawn to scale, shows a triangle ABC in which the point A is $(9, 9)$ and the point B is $(1, -3)$. The point C lies on the perpendicular bisector of AB and the equation of the line BC is $y = 8x - 11$. Find

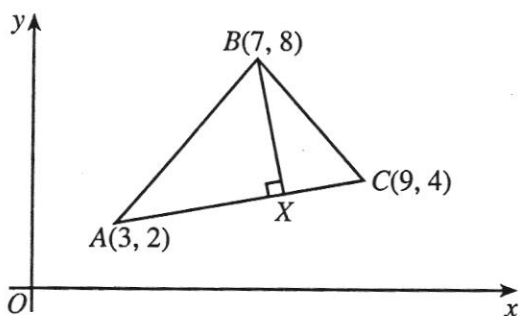
- (i) the equation of the perpendicular bisector of AB , [4]
- (ii) the coordinates of C . [2]

The point D is such that $ACBD$ is a rhombus.

- (iii) Find the coordinates of D . [2]
- (iv) Show that $AB = 2CD$. [2]

N2007/II/11

18 Solutions to this question by accurate drawing will not be accepted.



The diagram shows a triangle ABC in which the coordinates of A , B and C are $(3, 2)$, $(7, 8)$ and $(9, 4)$ respectively. The point X lies on AC , and BX is perpendicular to AC .

- (i) Find the coordinate of X . [6]
- (ii) Find, in the form $n : 1$, the ratio of the area of triangle ABX to the area of triangle CBX . [2]

The point D is the reflection of B in the line AC .

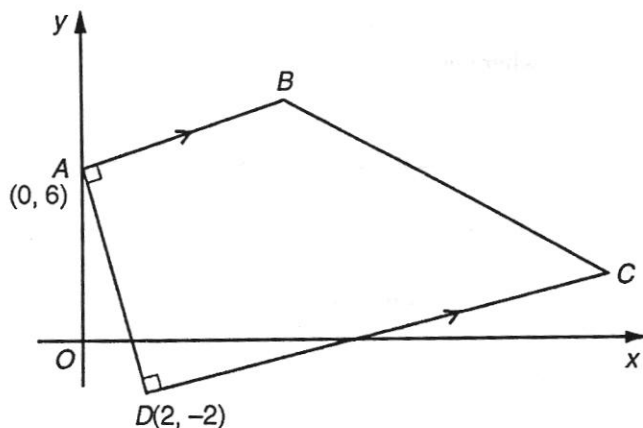
- (iii) Find the coordinate of D . [2]

N2008/I/9 (Syll. 4018)

19 The line $2y + x = 8$ meets the curve $x^2 + y^2 = 20$ at the points A and B . Show that the mid-point of AB lies on the line $y = 2x$. [6]

N2008/II/7 (Syll. 4018)

20 Solutions to this question by accurate drawing will not be accepted.



The diagram shows a trapezium $ABCD$ in which AB is parallel to DC and angle $BAD = 90^\circ$. The point A is $(0, 6)$ and the point D is $(2, -2)$.

- (i) Find the equation of AB . [3]

Given that B lies on the line $y = x$, find

- (ii) the coordinates of B . [2]

Given that the length of DC is twice the length of AB , find

- (iii) the coordinates of C , [2]
- (iv) the area of the trapezium $ABCD$. [2]

N2009/II/11

SAMPLE QUESTIONS

- 1 Find the centre and radius of the circle with equation:
 - (a) $x^2 + y^2 + 8x + 2y - 5 = 0$
 - (b) $2x^2 + 2y^2 - 6x + 3 = 0$
- 2 (a) Find the equation of the circle with centre $(2, -3)$ and radius 6.
 (b) Determine, by calculation whether the point $(6, 1)$ lies inside or outside the circle.
- 3 Find the equation of the circle whose centre is at the point $(2, 1)$ and passes through the point $(4, -3)$.
- 4 The points $(8, 4)$ and $(2, 2)$ are the two end points of a diameter of a circle. Find the equation of the circle.
- 5 Find the equation of the circle, centre $(4, 5)$, which passes through the point where the line $5x - 2y + 6 = 0$ cuts the y -axis.
- 6 Find the equation of the circle whose centre is $(2, -3)$, and touches the x -axis.
- 7 Find the equation of the circle which passes through the points $A(2, 0)$, $B(0, 2)$ and $C(-4, 0)$.
- 8 Show that the circle $x^2 + y^2 - 2x - 2y + 4 = 0$ touches the y -axis.
- 9 Find the equation of the circle which passes through the points $(0, 1)$ and $(3, -2)$ and has its centre lying on the line $y = x - 2$.
- 10 The line $y = -2x + 8$ cuts the curve $y = \frac{6}{x}$ at points A and B .
 - (a) Find the coordinates of A and of B .
 - (b) Find the area of the triangle OAB .
 - (c) Find the length AB and the perpendicular distance from the origin O to the line AB .
- 11 The equation of a circle, C , is $x^2 + y^2 - 2x - 6y + 9 = 0$.
 - (a) Find the coordinates of the centre of C and find the radius of C .

- (b) Show that C touches the y -axis.
- (c) Find the equation of the circle which is a reflection of C in the y -axis.

Answers

1. (a) $(-4, -1), \sqrt{22}$
 (b) $(1\frac{1}{2}, 0), \frac{\sqrt{3}}{2}$
2. (a) $x^2 + y^2 - 4x + 6y - 23 = 0$
 (b) Inside
3. $x^2 + y^2 - 4x - 2y - 15 = 0$
4. $x^2 + y^2 - 10x - 6y + 24 = 0$
5. $x^2 + y^2 - 8x - 10y + 21 = 0$
6. $x^2 + y^2 - 4x + 6y + 4 = 0$
7. $x^2 + y^2 + 2x + 2y - 8 = 0$
9. $x^2 + y^2 - 2x + 2y - 3 = 0$
10. (a) $(3, 2)$ $(1, 6)$
 (b) 8 units²
 (c) $2\sqrt{5}$ units, $\frac{8\sqrt{5}}{5}$ units
11. (a) $(1, 3)$, 1 unit
 (c) $x^2 + y^2 + 2x - 6y + 9 = 0$