ADDITIONAL MATHEMATICS
2002 – 2011
CLASSIFIED COORDINATE GEOMETRY

Compiled & Edited
By
Dr. Eltayeb Abdul Rhman

www.drtayeb.tk

First Edition
2011
The points $A$ and $B$ have coordinates $(-2, 15)$ and $(3, 5)$ respectively. The perpendicular to the line $AB$ at the point $A (-2, 15)$ crosses the $y$-axis at the point $C$. Find the area of the triangle $ABC$. 

[6]
The diagram shows the quadrilateral $ABCD$ in which $A$ is the point $(4, 2)$ and $B$ is the point $(-2, -10)$. The points $C$ and $D$ lie on the line $x = 14$. The diagonal $AC$ is perpendicular to $AB$ and passes through the mid-point, $M$, of the diagonal $BD$. Find the area of the quadrilateral $ABCD$. [9]
The line $CD$ is the perpendicular bisector of the line joining the point $A (-1, -5)$ and the point $B (5, 3)$.

(i) Find the equation of the line $CD$. \[4\]
The figure shows a right-angled triangle \(ABC\), where the point \(A\) has coordinates \((-4, 2)\), the angle \(B\) is 90° and the point \(C\) lies on the \(x\)-axis. The point \(M(1,3)\) is the midpoint of \(AB\). Find the area of the triangle \(ABC\). [7]
6 Solutions to this question by accurate drawing will not be accepted.

The points $A(1, 4)$, $B(3, 8)$, $C(13, 13)$ and $D$ are the vertices of a trapezium in which $AB$ is parallel to $DC$ and angle $BAD$ is $90^\circ$. Find the coordinates of $D$. [6]
Solutions to this question by accurate drawing will not be accepted.

The diagram, which is not drawn to scale, shows a trapezium $ABCD$ in which $BC$ is parallel to $AD$. The side $AD$ is perpendicular to $DC$. Point $A$ is $(1, 2)$, $B$ is $(4, 11)$ and $D$ is $(17, 10)$. Find

(i) the coordinates of $C$.

The lines $AB$ and $DC$ are extended to meet at $E$. Find

(ii) the coordinates of $E$,

(iii) the ratio of the area of triangle $EBC$ to the area of trapezium $ABCD$.

[11]
Solutions to this question by accurate drawing will not be accepted.

The diagram shows a triangle $ABC$ in which $A$ is the point $(3, 2)$, $C$ is the point $(7, 4)$ and angle $ACB = 90^\circ$. The line $BD$ is parallel to $AC$ and $D$ is the point $(13\frac{1}{2}, 11)$. The lines $BA$ and $DC$ are extended to meet at $E$. Find

(i) the coordinates of $B$, [7]

(ii) the ratio of the area of the quadrilateral $ABDC$ to the area of the triangle $EBD$. [3]
10 Solutions to this question by accurate drawing will not be accepted.

In the diagram the points $A$, $B$ and $C$ have coordinates $(-2, 4)$, $(1, -1)$ and $(6, 2)$ respectively. The line $AD$ is parallel to $BC$ and angle $ACD = 90^\circ$.

(i) Find the equations of $AD$ and $CD$. [6]

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

(iii) Show that triangle $ACD$ is isosceles. [2]
Answer only one of the following two alternatives.

**EITHER**

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

The diagram, which is not drawn to scale, shows a right-angled triangle $ABC$, where $A$ is the point $(6, 11)$ and $B$ is the point $(8, 8)$. The point $D(5, 6)$ is the mid-point of $BC$. The line $DE$ is parallel to $AC$ and angle $DEC$ is a right-angle. Find the area of the entire figure $ABDECA$. [11]
The diagram, which is not drawn to scale, shows a quadrilateral $ABCD$ in which $A$ is $(6, -3)$, $B$ is $(0, 6)$ and angle $BAD$ is $90^\circ$. The equation of the line $BC$ is $5y = 3x + 30$ and $C$ lies on the line $y = x$. The line $CD$ is parallel to the $y$-axis.

(i) Find the coordinates of $C$ and of $D$. [6]

(ii) Show that triangle $BAD$ is isosceles and find its area. [4]
Solutions to this question by accurate drawing will not be accepted.

The diagram shows a quadrilateral $ABCD$. The point $E$ lies on $AD$ such that angle $AEB = 90^\circ$. The line $EC$ is parallel to the $x$-axis and the line $CD$ is parallel to the $y$-axis. The points $A$ and $E$ are $(-1, 6)$ and $(3, 4)$ respectively. Given that the gradient of $AB$ is $\frac{1}{3}$,

(i) find the coordinates of $B$. \[5\]

Given also that the area of triangle $EBC$ is 24 units$^2$,

(ii) find the coordinates of $C$. \[3\]

(iii) find the coordinates of $D$. \[2\]
In the diagram the points $A(–1, 5), B(–2, 6), C(4, 10)$ and $D$ are the vertices of a quadrilateral in which $AD$ is parallel to the $x$-axis. The perpendicular bisector of $BC$ passes through $D$. Find the area of the quadrilateral $ABCD$. [8]
The points A and B have coordinates (−2, 15) and (3, 5) respectively. The perpendicular to the line AB at the point A (−2, 15) crosses the y-axis at the point C. Find the area of the triangle ABC.
12 The tangent to the curve \( y = 3x^3 + 2x^2 - 5x + 1 \) at the point where \( x = -1 \) meets the \( y \)-axis at the point \( A \).

(i) Find the coordinates of the point \( A \). \[3\]

The curve meets the \( y \)-axis at the point \( B \). The normal to the curve at \( B \) meets the \( x \)-axis at the point \( C \). The tangent to the curve at the point where \( x = -1 \) and the normal to the curve at \( B \) meet at the point \( D \).

(ii) Find the area of the triangle \( ACD \). \[7\]
The diagram shows the quadrilateral $ABCD$ in which $A$ is the point $(4, 2)$ and $B$ is the point $(-2, -10)$. The points $C$ and $D$ lie on the line $x = 14$. The diagonal $AC$ is perpendicular to $AB$ and passes through the mid-point, $M$, of the diagonal $BD$. Find the area of the quadrilateral $ABCD$. [9]
11 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 \( D \).  

(ii) the perimeter of the parallelogram \( OABC \), correct to 1 decimal place.

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 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]
OR 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]
11 Solutions to this question by accurate drawing will not be accepted.

The diagram shows a triangle $ABC$ in which $A$ is the point $(6, -3)$. The line $AC$ passes through the origin $O$. The line $OB$ is perpendicular to $AC$.

(i) Find the equation of $OB$. [2]

The area of triangle $AOB$ is 15 units$^2$.

(ii) Find the coordinates of $B$. [3]

The length of $AO$ is 3 times the length of $OC$.

(iii) Find the coordinates of $C$. [2]

The point $D$ is such that the quadrilateral $ABCD$ is a kite.

(iv) Find the area of $ABCD$. [2]
The diagram shows the line $AB$ passing through the points $A(-4, 0)$ and $B(8, 9)$. The line through the point $P(1, 10)$, perpendicular to $AB$, meets $AB$ at $C$ and the $x$-axis at $Q$. Find

(i) the coordinates of $C$ and of $Q$, 

(ii) the area of triangle $ACQ$. 

Solutions to this question by accurate drawing will not be accepted.
The diagram shows a quadrilateral $ABCD$ in which $A$ is the point $(1, 4)$ and $B$ is the point $(6, 5)$. Angle $ABC$ is a right angle and the point $C$ lies on the $x$-axis. The line $AD$ is parallel to the $y$-axis and the line $CD$ is parallel to $BA$. Find

(i) the equation of the line $CD$, 

(ii) the area of the quadrilateral $ABCD$. 

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

The diagram shows a quadrilateral $ABCD$ in which $A$ is the point $(1, 4)$ and $B$ is the point $(6, 5)$. Angle $ABC$ is a right angle and the point $C$ lies on the $x$-axis. The line $AD$ is parallel to the $y$-axis and the line $CD$ is parallel to $BA$. Find

(i) the equation of the line $CD$, [5]

(ii) the area of the quadrilateral $ABCD$. [4]
ADDITONAL MATHEMATICS

2002 – 2011

CLASSIFIED COORDINATE GEOMETRY

Compiled & Edited
By

Dr. Eltayeb Abdul Rhman

www.drtayeb.tk

First Edition
2011