ADDITONAL MATHEMATICS

2002 – 2011

CLASSIFIED COORDINATE GEOMETRY

Compiled & Edited
By

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www.drtayeb.tk

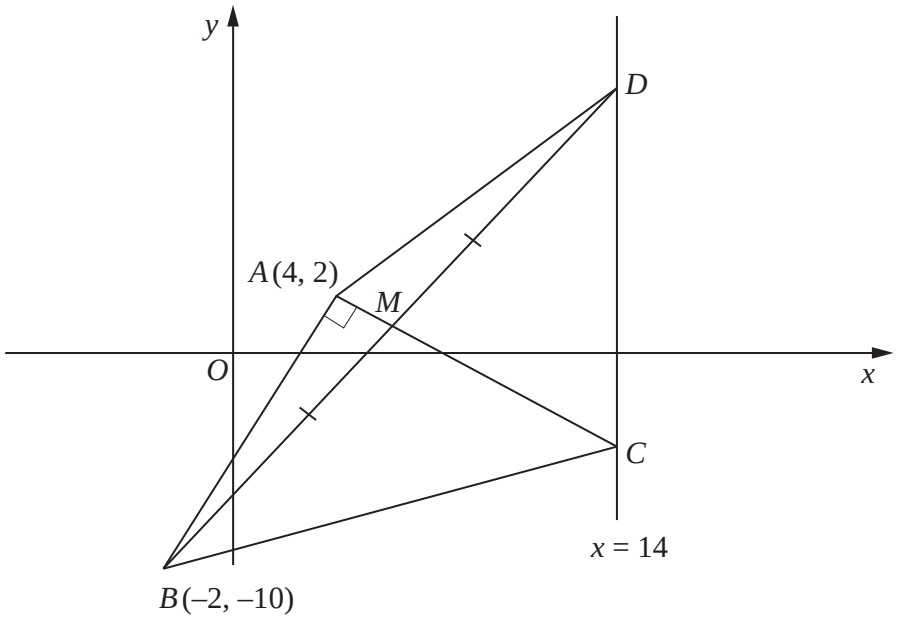
First Edition
2011

7 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]

For Examiner's Use

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

For Examiner's Use



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*.

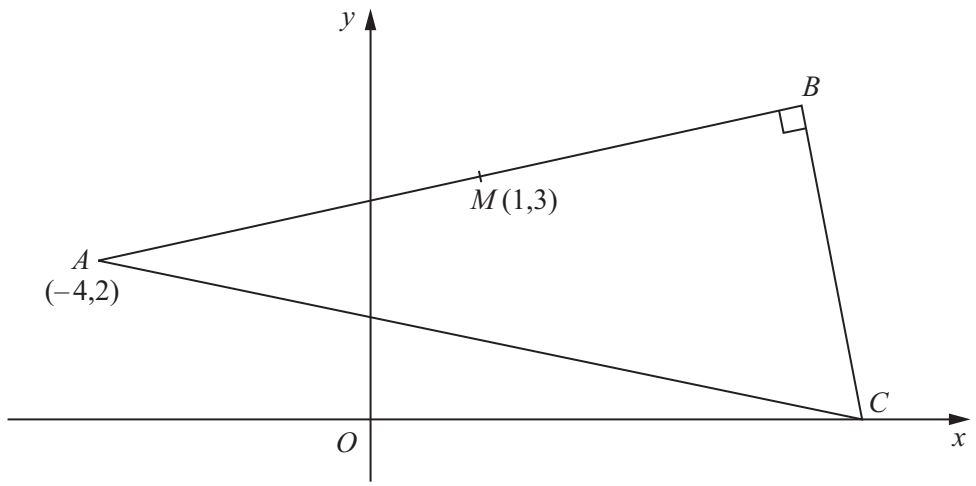
[9]

8 The line CD is the perpendicular bisector of the line joining the point A $(-1, -5)$ and the point B $(5,3)$.

For Examiner's Use

(i) Find the equation of the line CD. [4]

7



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]

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For Examiner's Use

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°. Find the coordinates of D. [6]

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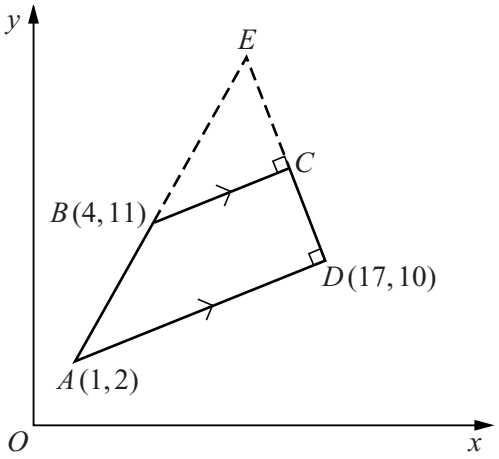

The diagram, which is not drawn to scale, shows a trapezium $ABCD$ in which BC is parallel to AD. The side AD is perpendicular to DC. Point A is (1, 2), B is (4, 11) and D is (17, 10). Find

(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]

11

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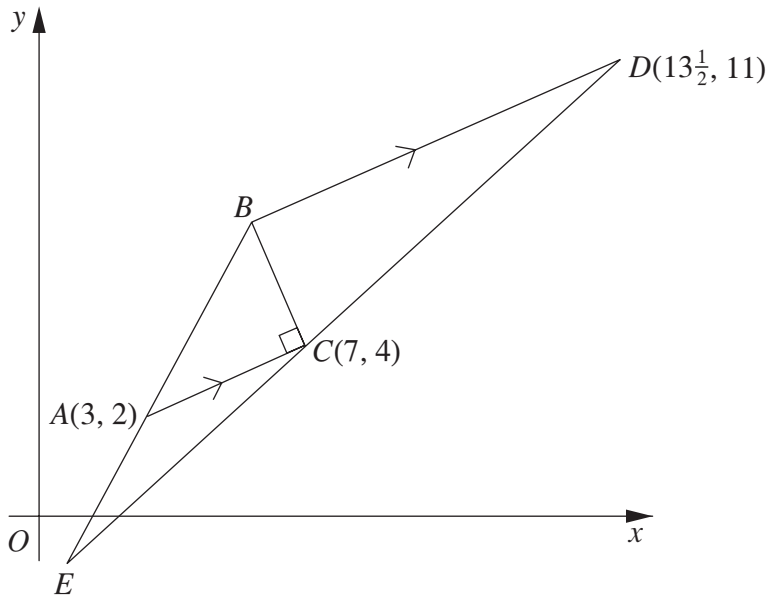
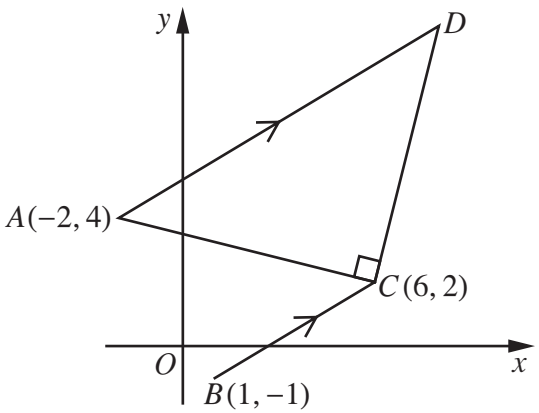


The diagram shows a triangle ABC in which A is the point $(3, 2)$, C is the point $(7, 4)$ and angle $ACB = 90°$. The line BD is parallel to AC and D is the point $(13\frac{1}{2}, 11)$. The lines BA and DC are extended to meet at E. Find

(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 $ACD = 90°$.

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

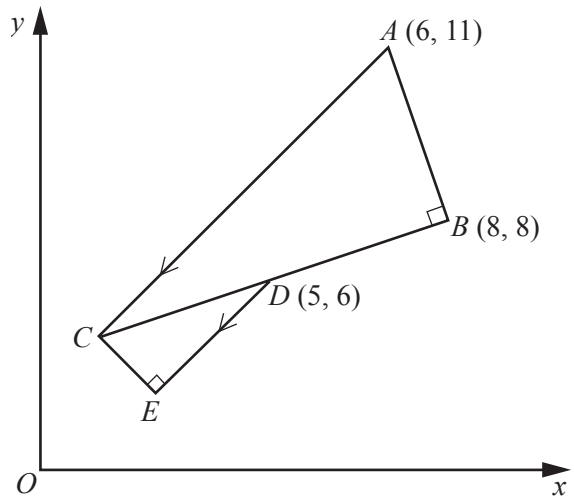
(ii) Find the coordinates of D. [2]

(iii) Show that triangle ACD is isosceles. [2]

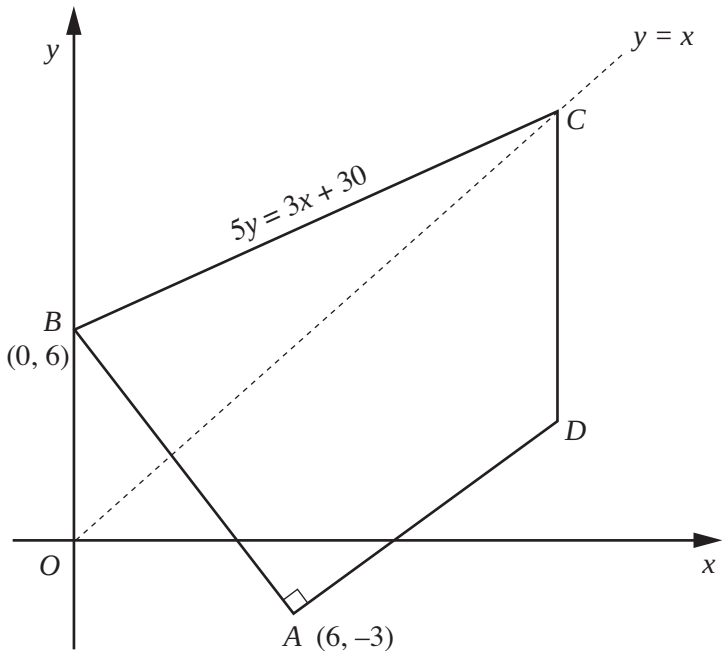
12 Answer only **one** of the following two alternatives.

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°. 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]

12

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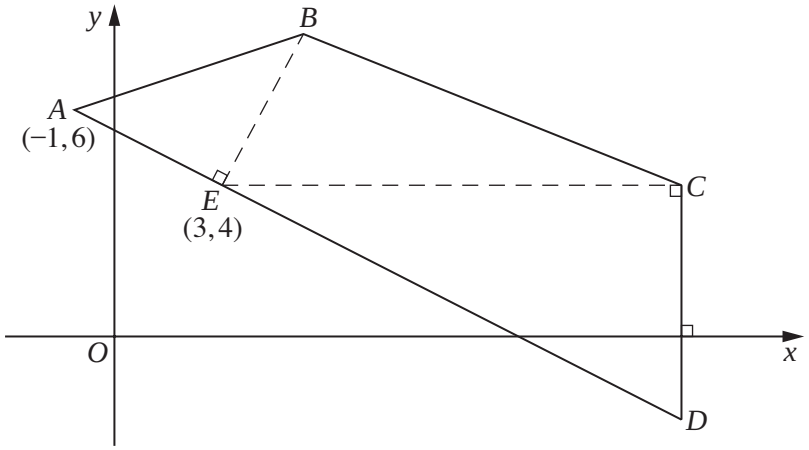


The diagram shows a quadrilateral *ABCD*. The point *E* lies on *AD* such that angle *AEB* = 90°. The line *EC* is parallel to the *x*-axis and the line *CD* is parallel to the *y*-axis. The points *A* and *E* are (– 1, 6) and (3, 4) respectively. Given that the gradient of *AB* is $\frac{1}{3}$,

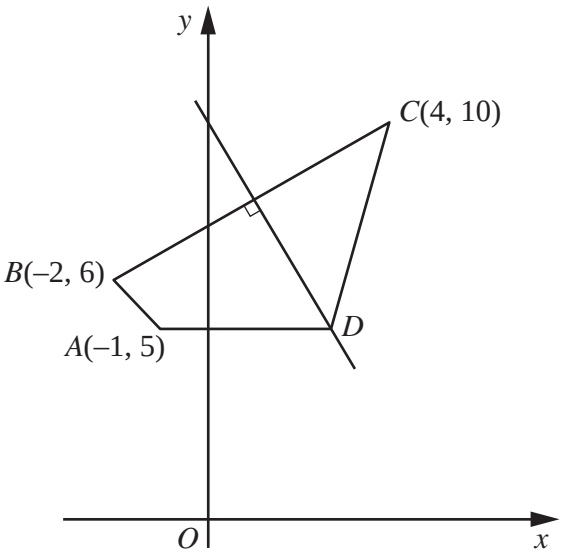
(i) find the coordinates of *B*. [5]

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]

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



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]

7 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]

For Examiner's Use

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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]

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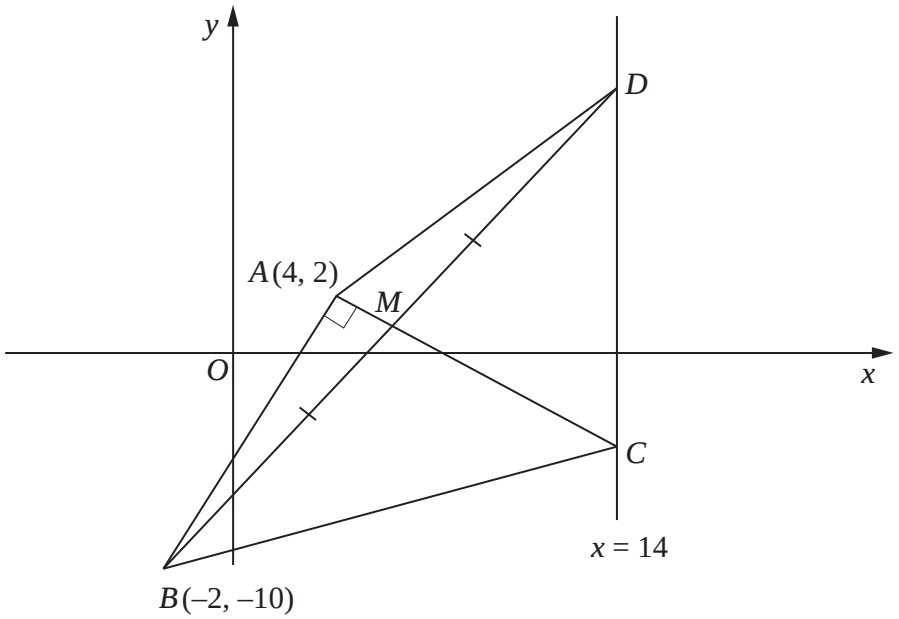
For Examiner's Use



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]

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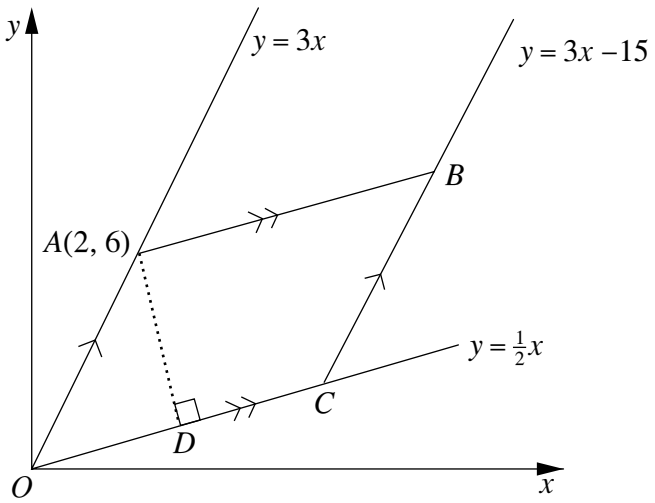
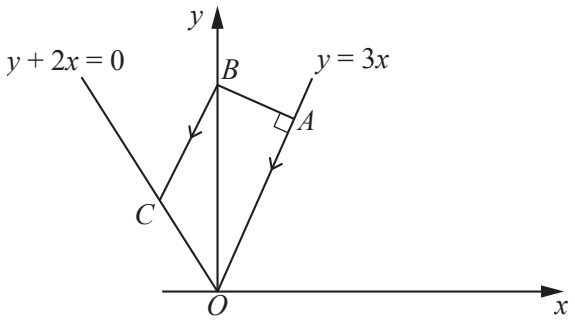


The diagram, which is not drawn to scale, shows a parallelogram $OABC$ where O is the origin and A is the point $(2, 6)$. The equations of OA, OC and CB are $y = 3x$, $y = \frac{1}{2}x$ and $y = 3x - 15$ respectively. The perpendicular from A to OC meets OC at the point D. Find

(i) the coordinates of C, B and D, [8]

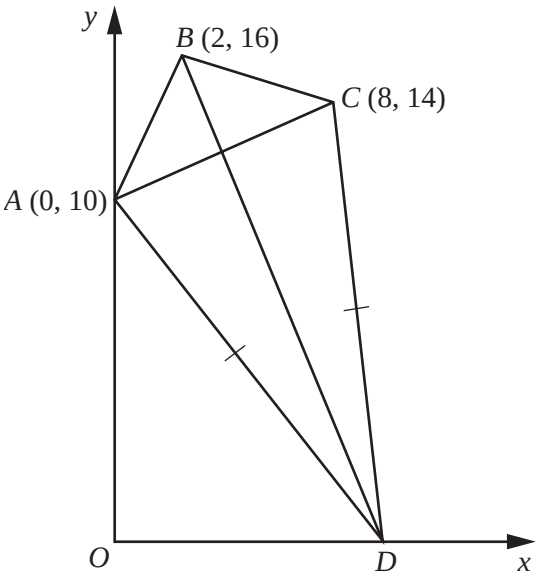
(ii) the perimeter of the parallelogram $OABC$, correct to 1 decimal place. [3]

11



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]

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).

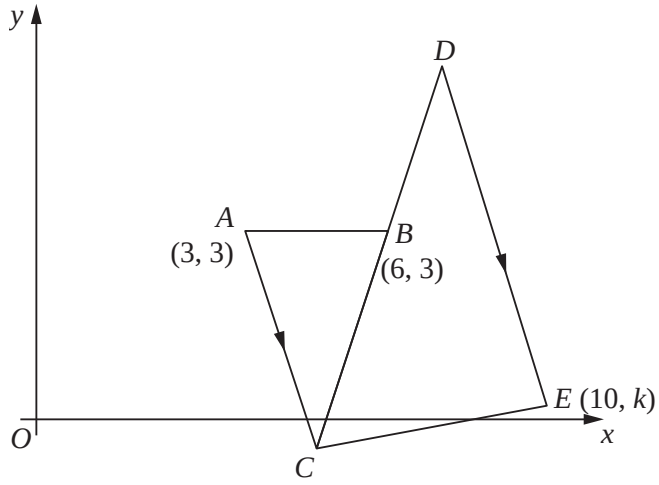
(i) Show that triangle *ABC* is isosceles. [2]

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]

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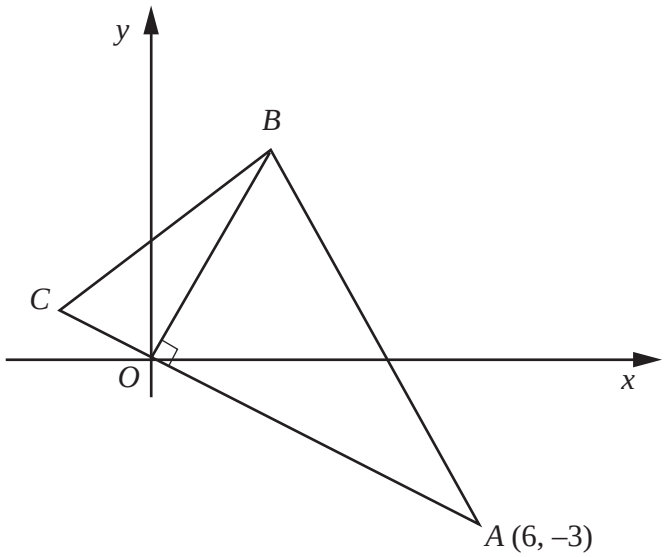

The diagram shows a triangle ABC in which A is the point (6, –3). The line AC passes through the origin O. The line OB is perpendicular to AC.

(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]

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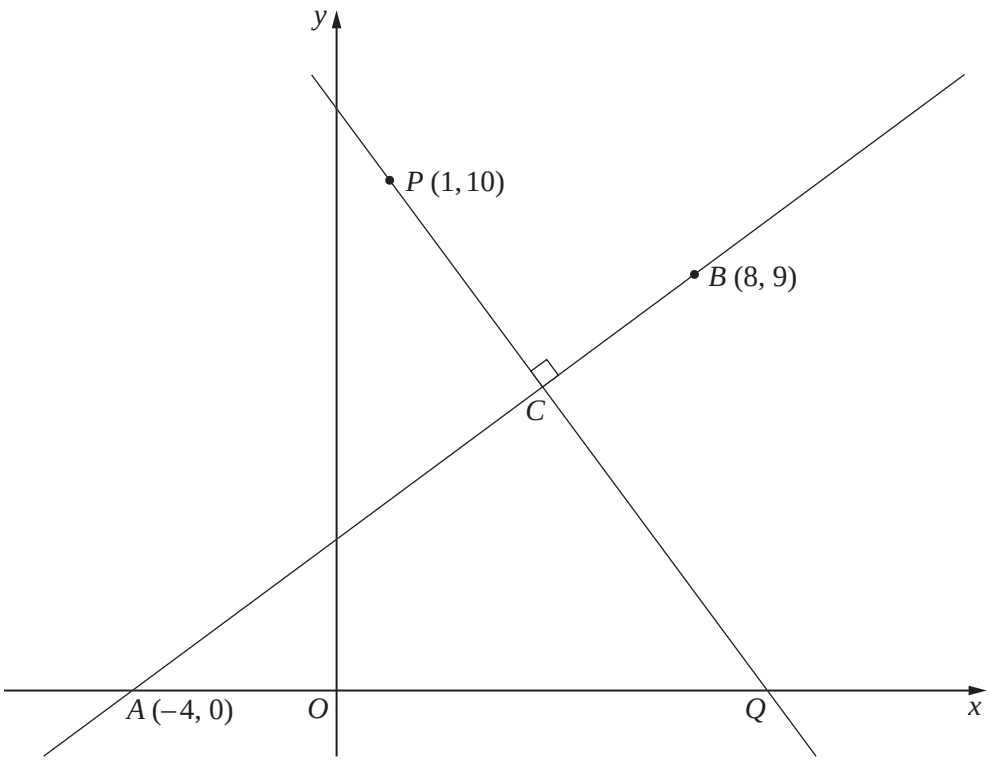

The diagram shows the line AB passing through the points $A(-4, 0)$ and $B(8, 9)$. The line through the point $P(1, 10)$, perpendicular to AB, meets AB at C and the x-axis at Q. Find

(i) the coordinates of C and of Q, [7]

(ii) the area of triangle ACQ. [2]

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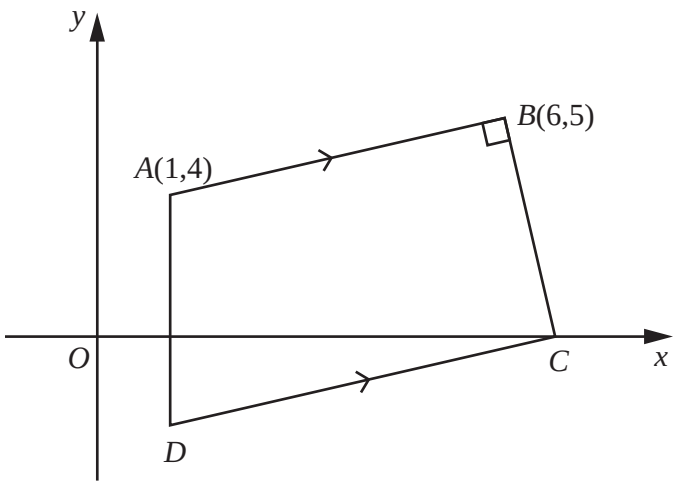

The diagram shows a quadrilateral *ABCD* in which *A* is the point (1, 4) and *B* is the point (6, 5). Angle *ABC* is a right angle and the point *C* lies on the *x*-axis. The line *AD* is parallel to the *y*-axis and the line *CD* is parallel to *BA*. Find

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

(ii) the area of the quadrilateral *ABCD*. [4]

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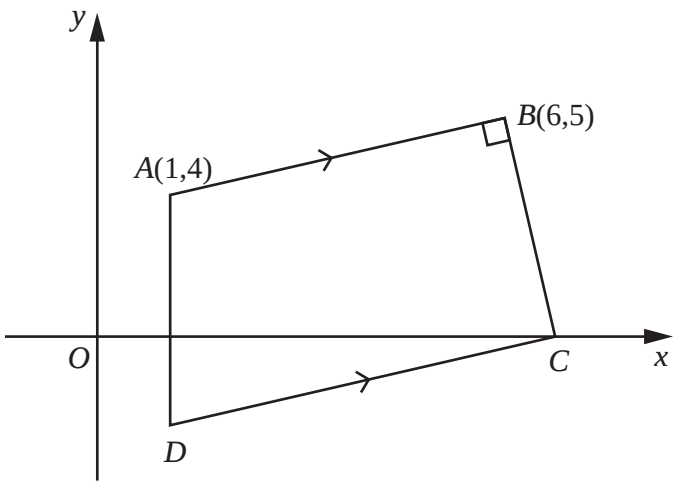

The diagram shows a quadrilateral *ABCD* in which *A* is the point (1, 4) and *B* is the point (6, 5). Angle *ABC* is a right angle and the point *C* lies on the *x*-axis. The line *AD* is parallel to the *y*-axis and the line *CD* is parallel to *BA*. Find

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

(ii) the area of the quadrilateral *ABCD*. [4]

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