Higher Mathematics

Straight Lines - Questions

Marks are indicated in brackets after each question number

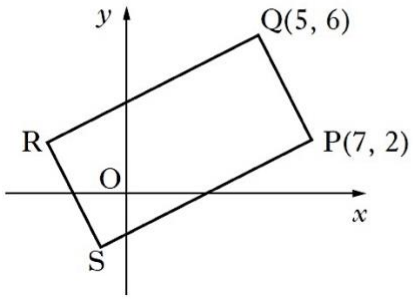
2013 Paper 1 Question 5, (2)

The line L passes through the point (–2, –1) and is parallel to the line with equation $5x + 3y - 6 = 0$.

What is the equation of L?

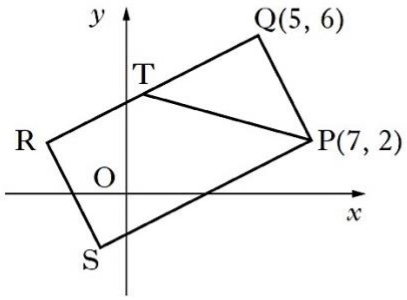
2013 Paper 2 Question 2, (3) (3) (3)

The diagram shows rectangle PQRS with P(7, 2) and Q(5, 6).



(*a*) Find the equation of QR.

(*b*) The line from P with the equation $x + 3y = 13$ intersects QR at T.

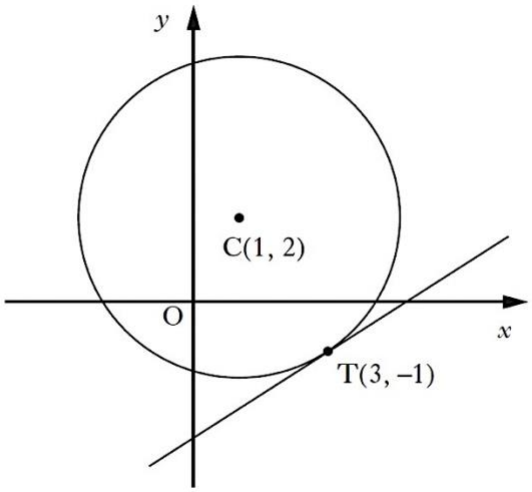


Find the coordinates of T.

(*c*) Given that T is the midpoint of QR, find the coordinates of R and S.

2014 Paper 1 Question 2, (2)

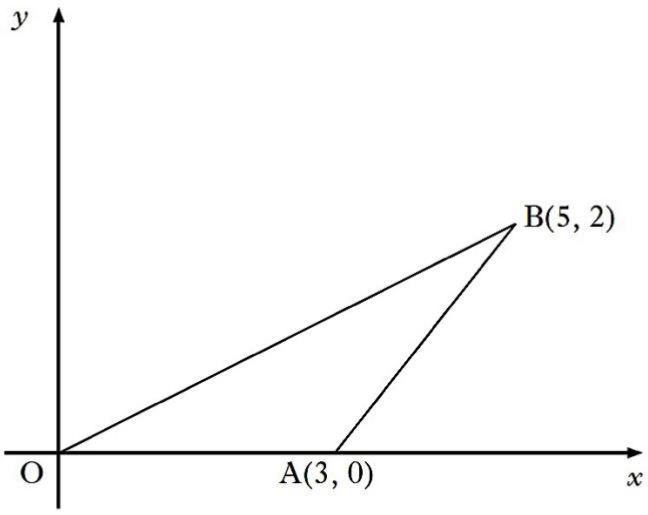
The diagram shows a circle with centre C(1, 2) and the tangent at T(3, –1).



What is the gradient of this tangent?

2014 Paper 2 Question 1, (4) (2) (2)

A(3, 0), B(5, 2) and the origin are the vertices of a triangle as shown in the diagram.



(*a*) Obtain the equation of the perpendicular bisector of AB.

(*b*) The median from A has equation $y + 2x = 6$.

Find T, the point of intersection of this median and the perpendicular bisector of AB.

(*c*) Calculate the angle that AT makes with the positive direction of the x-axis.

2015 Paper 1 Question 9, (3)

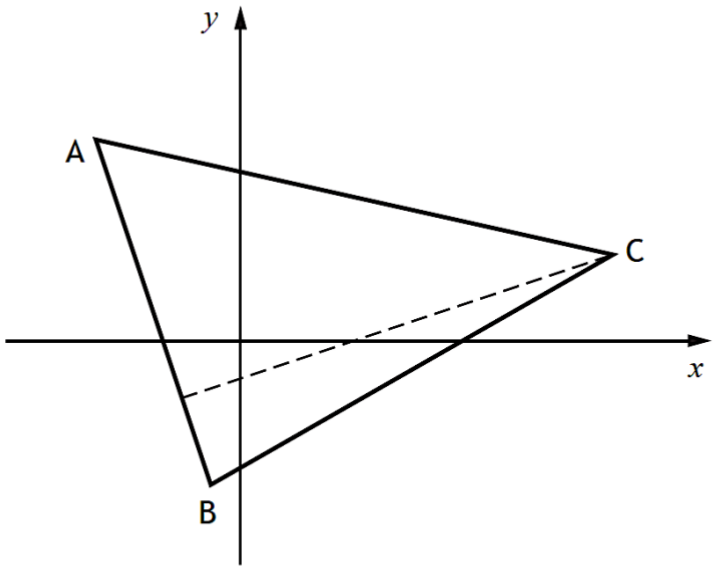
A, B and C are points such that AB is parallel to the line with equation $y + \sqrt{3}x = 0$ and BC makes an angle of $150°$ with the positive direction of the x-axis.

Are the points A, B and C collinear?

2015 Paper 2 Question 1, (4) (3)

The vertices of triangle ABC are A$(-5, 7)$, B$(-1, -5)$ and C$(13, 3)$ as shown in the diagram.

The broken line represents the altitude from C.



(a) Show that the equation of the altitude from C is $x - 3y = 4$.

(b) Find the equation of the median from B.

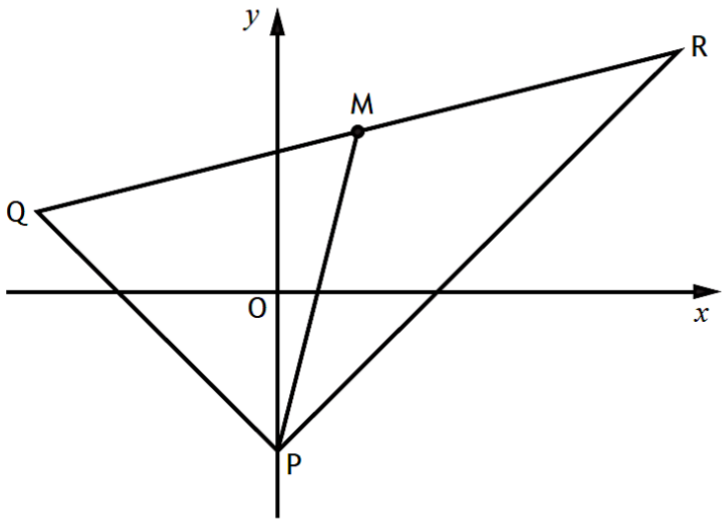
(c) Find the coordinates of the point of intersection of the altitude from C and the median from B.

2016 Paper 1 Question 1, (2)

Find the equation of the line passing through the point $(-2, 3)$ which is parallel to the line with equation $y + 4x = 7$.

2016 Paper 2 Question 1, (1) (2) (3)

PQR is a triangle with vertices $P(0,-4)$, $Q(-6,2)$ and $R(10,6)$.



(a) (i) State the coordinates of M, the midpoint of QR.

(ii) Hence find the equation of PM, the median through P.

(b) Find the equation of the line, L, passing through M and perpendicular to PR.

(c) Show that line L passes through the midpoint of PR.

2017 Paper 1 Question 7, (3)

A $(-3, 5)$, B $(7, 9)$ and C $(2, 11)$ are the vertices of a triangle.

Find the equation of the median through C.

2017 Paper 1 Question 11, (3)

A and B are the points $(-7, 2)$ and $(5, a)$.

AB is parallel to the line with equation $3y - 2x = 4$.

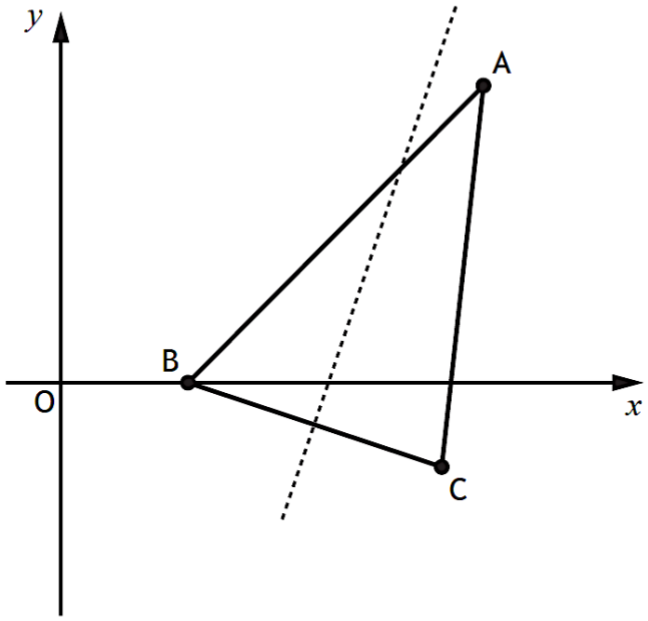
Determine the value of a.

2017 Paper 2 Question 1, (4) (2) (2)

Triangle ABC is shown in the diagram below.

The coordinates of B are (3,0) and the coordinates of C are (9,−2).

The broken line is the perpendicular bisector of BC.



(a) Find the equation of the perpendicular bisector of BC.

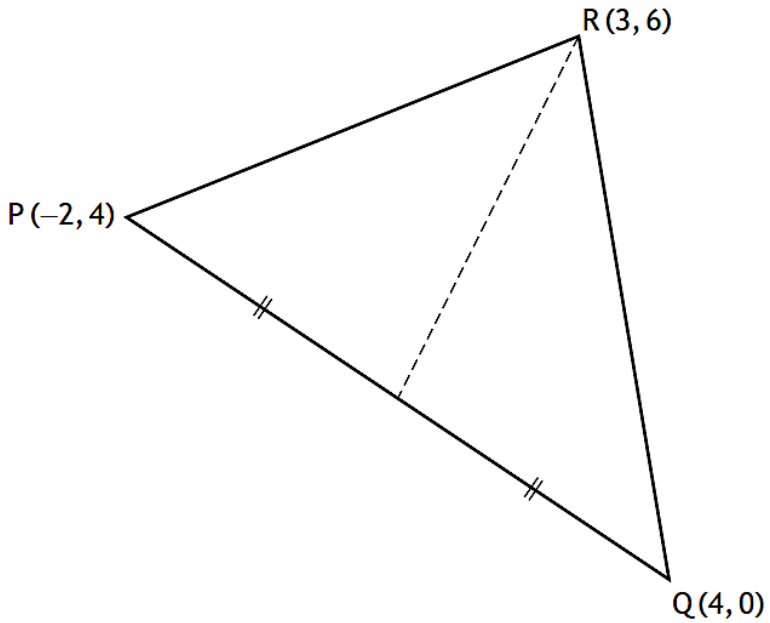
(b) The line AB makes an angle of 45° with the positive direction of the x-axis.

Find the equation of AB.

(c) Find the coordinates of the point of intersection of AB and the perpendicular bisector of BC.

2018 Paper 1 Question 1, (3)

PQR is a triangle with vertices P (–2, 4), Q (4, 0) and R (3, 6).



Find the equation of the median through R.

2018 Paper 1 Question 5, (1) (1)

A (–3, 4, –7), B (5, t, 5) and C (7, 9, 8) are collinear.

(a) State the ratio in which B divides AC.

(b) State the value of t.

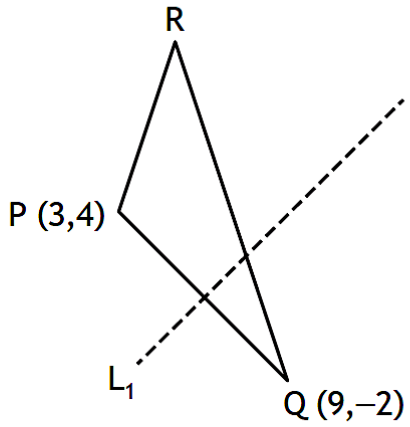
2018 Paper 1 Question 8, (2)

A line has equation $y-\sqrt{3}x+5=0$.

Determine the angle this line makes with the positive direction of the x-axis.

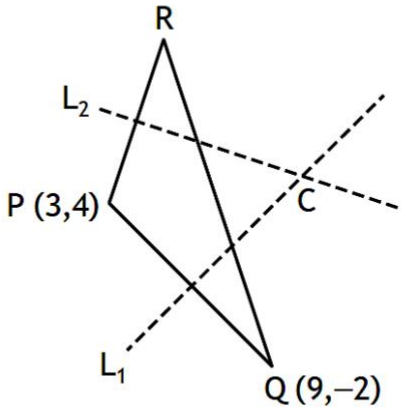
2018 Paper 2 Question 5, (3) (2)

PQR is a triangle with P(3,4) and Q(9,−2).



(a) Find the equation of L_1, the perpendicular bisector of PQ.

The equation of L_2, the perpendicular bisector of PR is $3y + x = 25$.



(b) Calculate the coordinates of C, the point of intersection of L_1 and L_2.

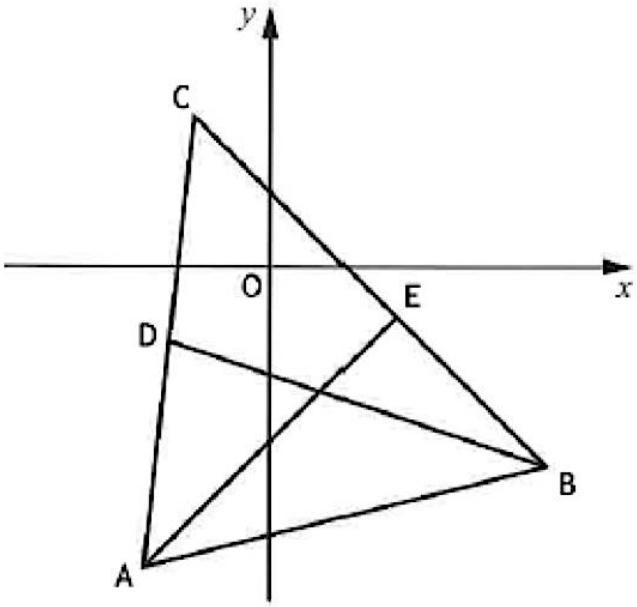
2019 Paper 1 Question 7, (4)

The line, L, makes an angle of 30° with the positive direction of the x-axis.

Find the equation of the line perpendicular to L, passing through (0,−4).

2019 Paper 2 Question 1, (3) (3) (2)

Triangle ABC has vertices A(−5,−12), B(11,−8) and C(−3,6).



(a) Find the equation of the median BD.

(b) Find the equation of the altitude AE.

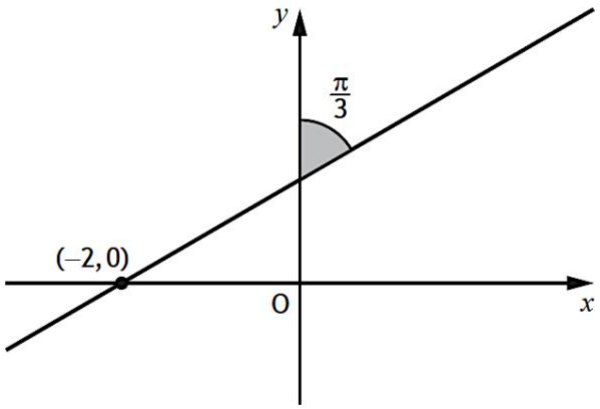
(c) Find the coordinates of the point of intersection of BD and AE.

2022 Paper 1 Question 1, (3)

Determine the equation of the line perpendicular to $5x+2y=7$, passing through $(-1,6)$.

2022 Paper 1 Question 5, (3)

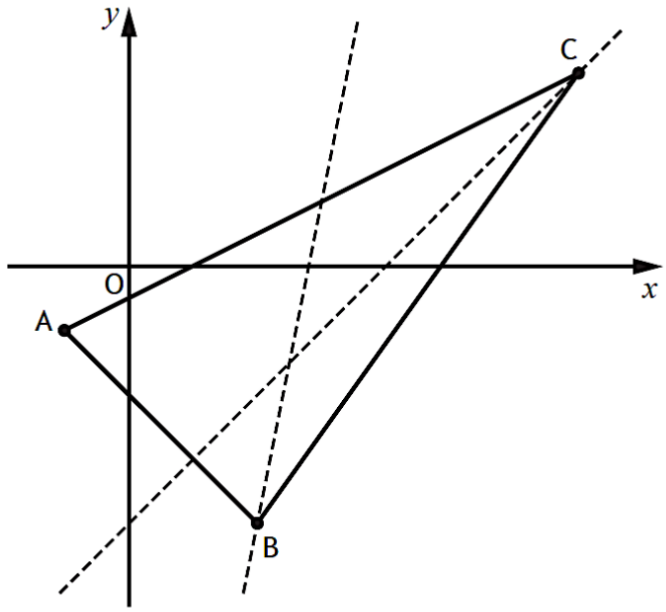
A line makes an angle of $\frac{\pi}{3}$ radians with the y-axis, and passes through the point $(-2, 0)$ as shown below.



Determine the equation of the line.

2022 Paper 2 Question 1, (3) (3) (2)

Triangle ABC has vertices A$(-1, -1)$, B$(2, -4)$ and C$(7, 3)$.



(a) Find the equation of the altitude through C.

(b) Find the equation of the median through B.

(c) Determine the coordinates of the point of intersection of the altitude through C and the median through B.

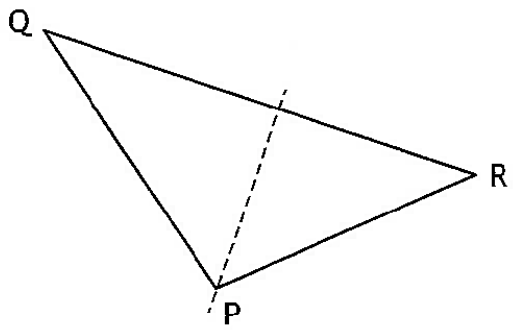
2023 Paper 1 Question 2, (4)

P and Q are the points $(-2, 6)$ and $(10, 0)$.

Find the equation of the perpendicular bisector of PQ.

2023 Paper 2 Question 1, (3) (2)

Triangle PQR has vertices $P(5, -1)$, $Q(-2, 8)$ and $R(13, 3)$.

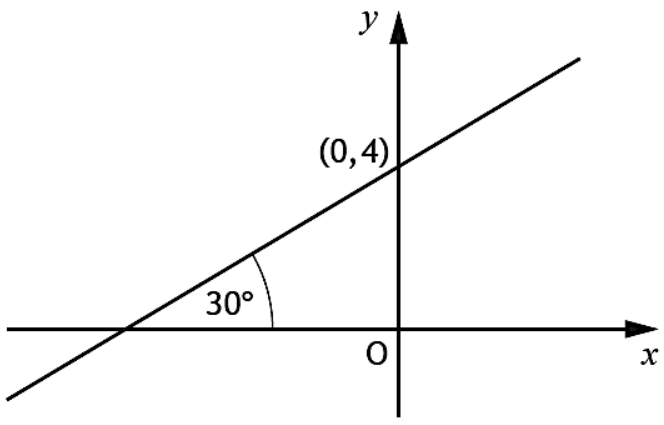


(a) Find the equation of the altitude from P.

(b) Calculate the angle that the side PR makes with the positive direction of the x-axis.

2024 Paper 1 Question 1, (3)

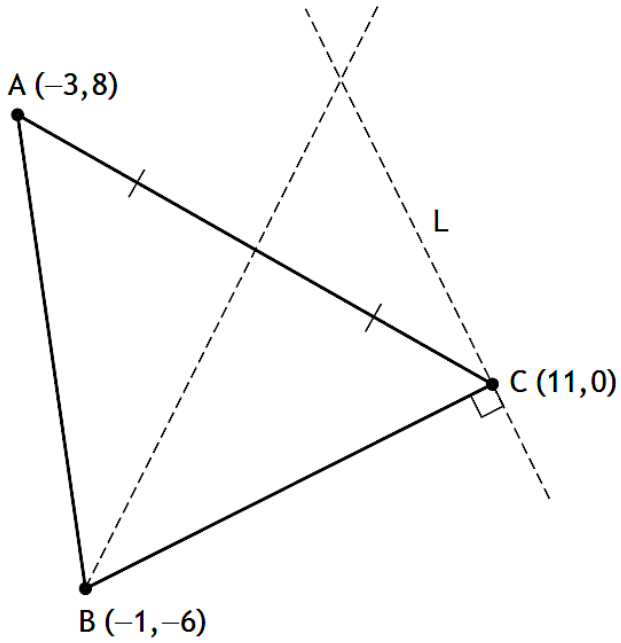
A line passes through the point $(0, 4)$ and makes an angle of 30° with the positive direction of the x-axis as shown in the diagram.



Determine the equation of the line.

2024 Paper 2 Question 1, (3) (3) (2)

Triangle ABC has vertices A(−3, 8), B(−1, −6) and C(11, 0).



(a) Find the equation of the median through B.

(b) Find the equation of L, the line perpendicular to BC passing through C.

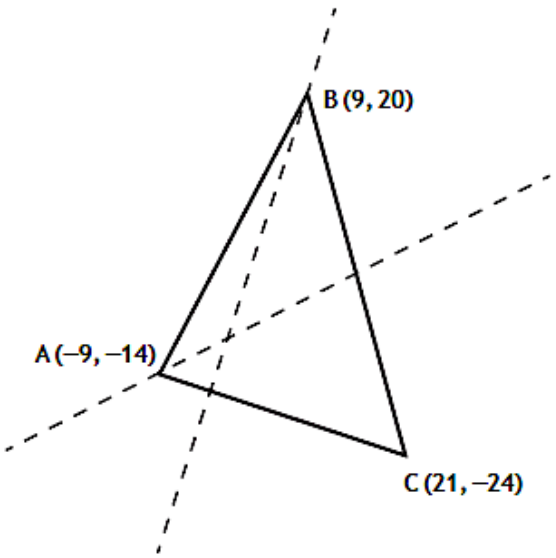
(c) Determine the coordinates of the point of intersection of the median through B and the line L.

2025 Paper 1 Question 2, (4)

Find the equation of the perpendicular bisector of the line joining A(1, 4) and B(9, 10).

2025 Paper 2 Question 1, (3) (3) (2)

Triangle ABC has vertices A (−9, −14), B (9, 20) and C (21, −24).



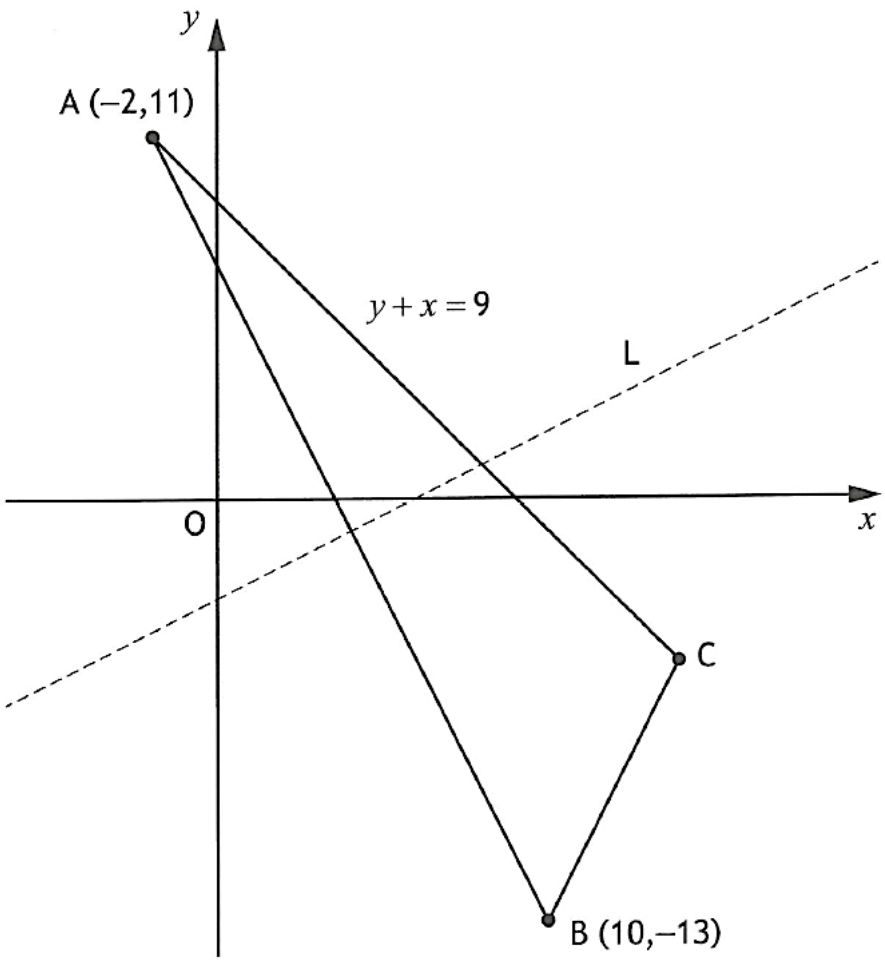
(a) Find the equation of the altitude through B.

(b) Find the equation of the median through A.

(c) Determine the point of intersection of the altitude through B and the median through A.

2026 Paper 2 Question 8, (4) (2)

A and B are the points (–2,11) and (10,–13).



(a) Find the equation of L, the perpendicular bisector of AB.

The equation of AC is $y + x = 9$.

(b) Calculate the size of the obtuse angle between L and AC.