

Coordinate Geometry – The Circle

Checklist	Completed	Revisit
▶ 2022 LCOL Paper 2 – Question 2	<input type="checkbox"/>	<input type="checkbox"/>
▶ 2021 LCOL Paper 2 – Question 4	<input type="checkbox"/>	<input type="checkbox"/>
▶ 2020 LCOL Paper 2 – Question 4	<input type="checkbox"/>	<input type="checkbox"/>
▶ 2019 LCOL Paper 2 – Question 4	<input type="checkbox"/>	<input type="checkbox"/>
▶ 2018 LCOL Paper 2 – Question 4	<input type="checkbox"/>	<input type="checkbox"/>
▶ 2017 LCOL Paper 2 – Question 2	<input type="checkbox"/>	<input type="checkbox"/>
▶ 2016 LCOL Paper 2 – Question 3	<input type="checkbox"/>	<input type="checkbox"/>
▶ 2015 LCOL Paper 2 – Question 3	<input type="checkbox"/>	<input type="checkbox"/>
▶ 2014 LCOL Paper 2 – Question 3	<input type="checkbox"/>	<input type="checkbox"/>
▶ 2014 LCOL Sample Paper 2 – Question 4	<input type="checkbox"/>	<input type="checkbox"/>
▶ 2013 LCOL Paper 2 – Question 4	<input type="checkbox"/>	<input type="checkbox"/>
▶ 2012 LCOL Paper 2 – Question 4	<input type="checkbox"/>	<input type="checkbox"/>
▶ 2012 LCOL Sample Paper 2 – Question 3	<input type="checkbox"/>	<input type="checkbox"/>
▶ 2012 LCOL Sample Paper 2 – Question 4 (b)	<input type="checkbox"/>	<input type="checkbox"/>
▶ 2011 LCOL Paper 2 – Question 2	<input type="checkbox"/>	<input type="checkbox"/>
▶ 2010 LCOL Paper 2 – Question 3	<input type="checkbox"/>	<input type="checkbox"/>

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► 2022 LCOL Paper 2 – Question 2 (a)

The circle k has equation $(x - 4)^2 + (y + 2)^2 = 169$.

(i) Write down the centre and radius of the circle k .

Centre = (,)	Radius = _____
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(ii) Is the point $(11, 10)$ on the circle k , inside the circle k , or outside the circle k ?

Show your working out.

Answer:

(Tick (✓) **one** box only)

$(11, 10)$ is
on k

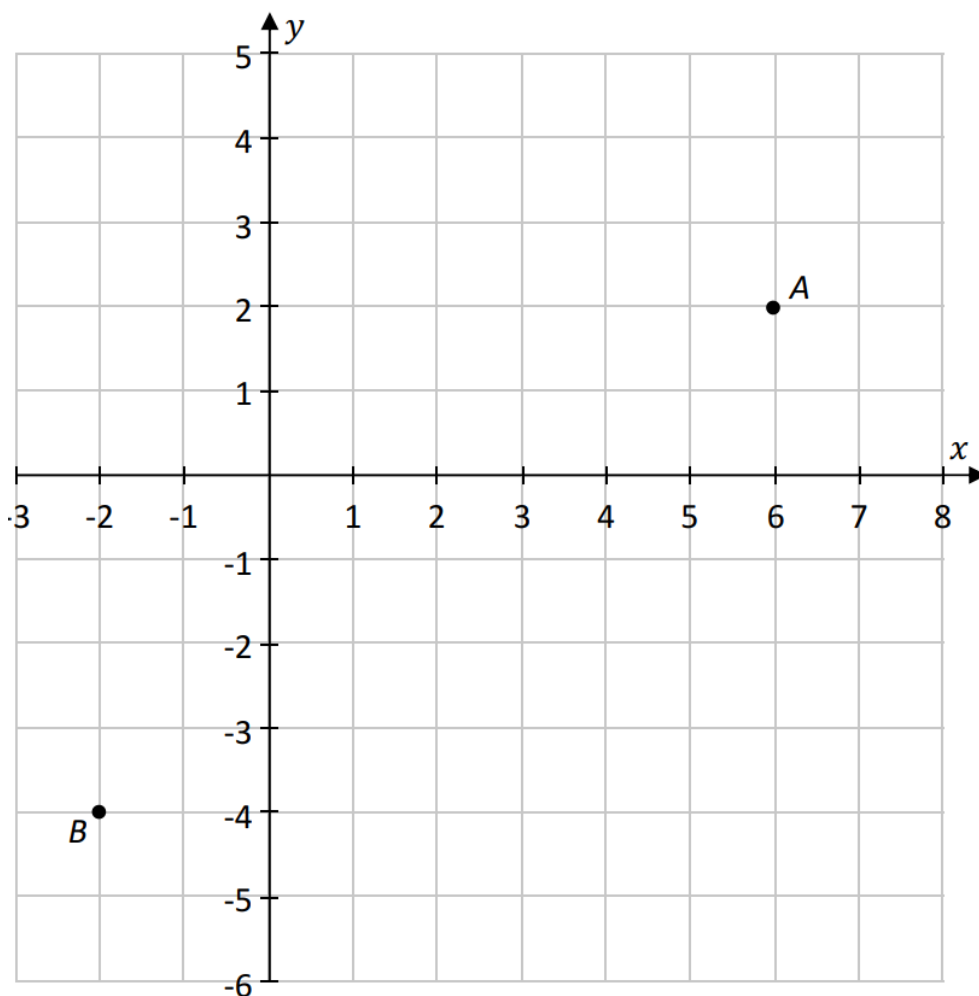
$(11, 10)$ is
inside k

$(11, 10)$ is
outside k

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► 2021 LCOL Paper 2 – Question 4

(a) The co-ordinate diagram below shows two points A and B .



(i) Write down the co-ordinates of A and of B .

$A = (\quad , \quad)$	$B = (\quad , \quad)$
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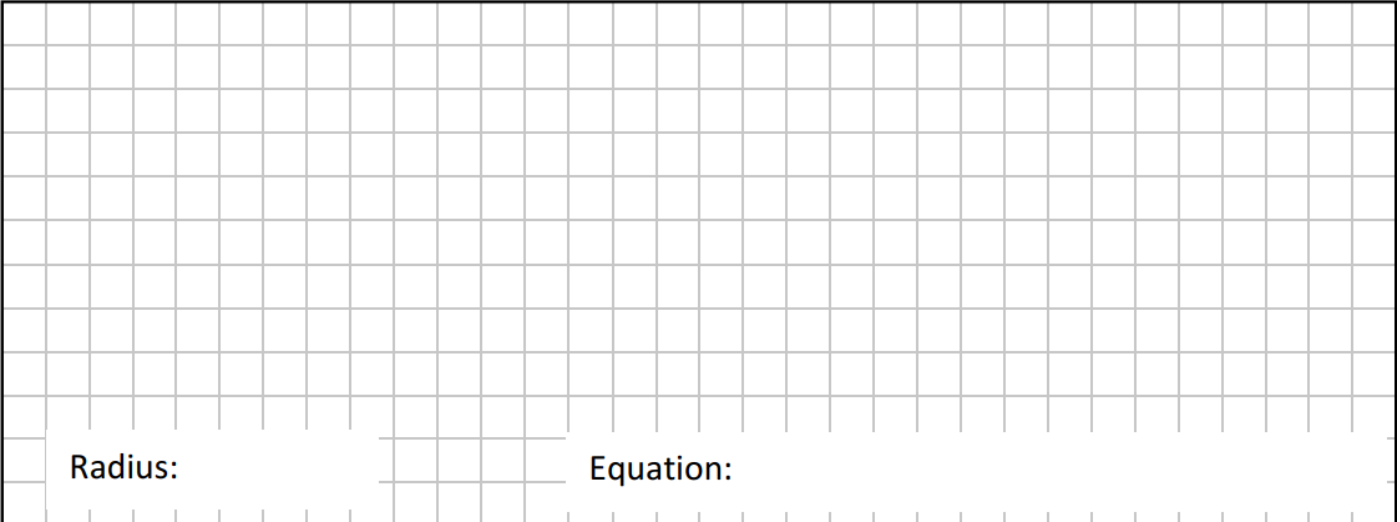
(ii) Find the co-ordinates of the midpoint of $[AB]$.

<div style="background-color: #f0f0f0; width: 100%; height: 100%; grid-template-columns: repeat(20, 1fr); grid-template-rows: repeat(10, 1fr); border: 1px solid #ccc;"></div>
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(iii) Use a compass to **construct** the circle c , which has AB as its diameter on the diagram above.

<div style="background-color: #f0f0f0; width: 100%; height: 100%; grid-template-columns: repeat(20, 1fr); grid-template-rows: repeat(10, 1fr); border: 1px solid #ccc;"></div>
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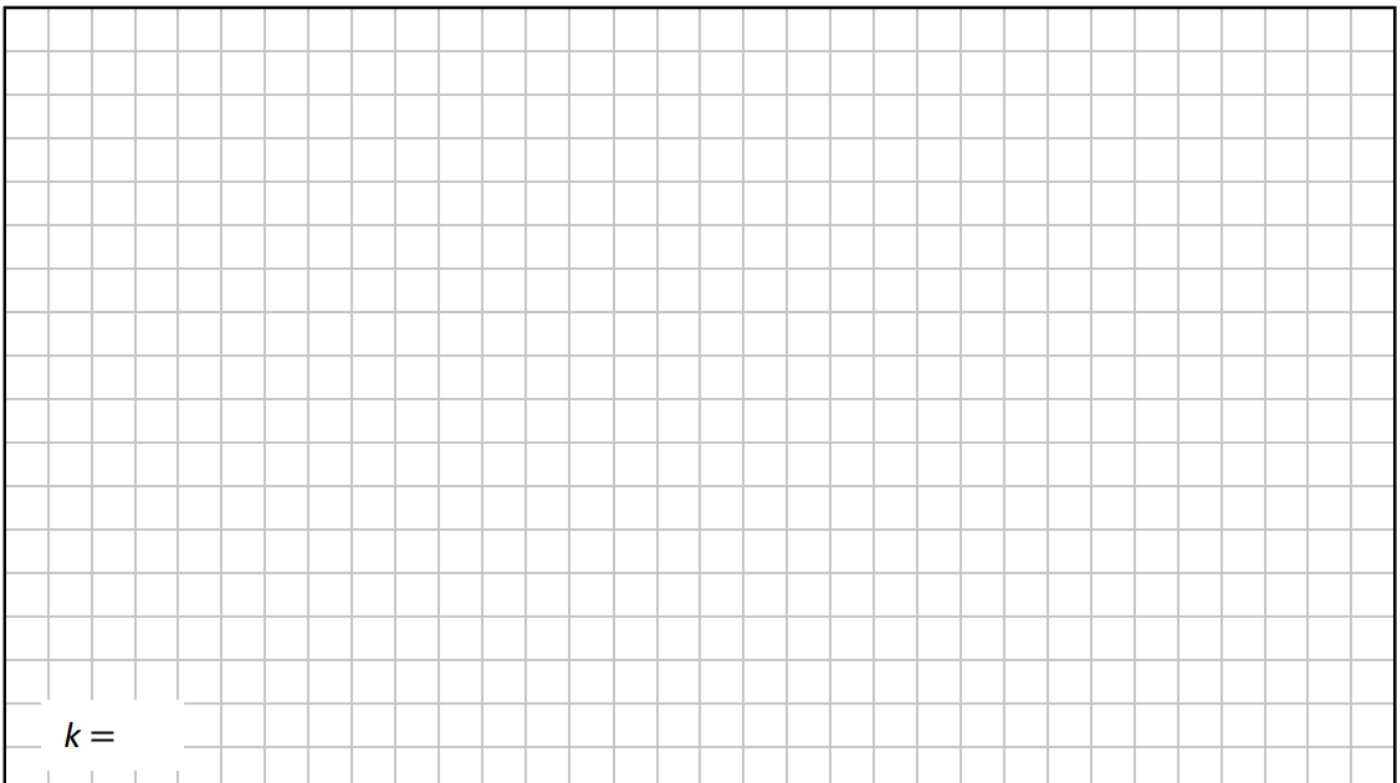
(iv) Find the length of the radius of the circle c , and hence write down the equation of c .



Radius: _____ Equation: _____

(b) The point $P(2, k)$ is in the first quadrant and is on c .

Use algebra to find the value of k and **plot the point P** on the diagram on the previous page.



$k =$ _____

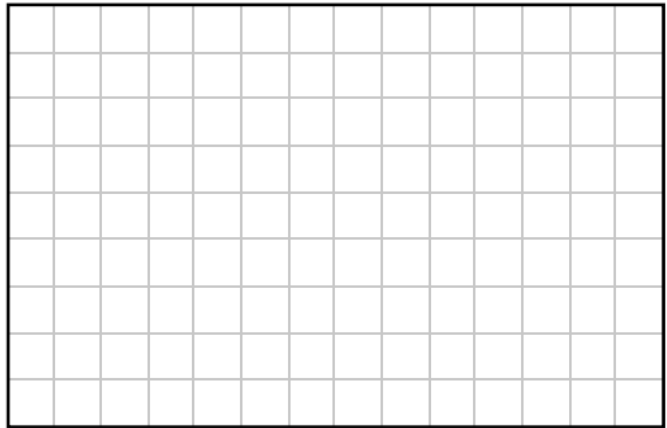
► 2020 LCOL Paper 2 – Question 4 (a)

The circle c has equation $(x - 1)^2 + (y + 4)^2 = 25$.

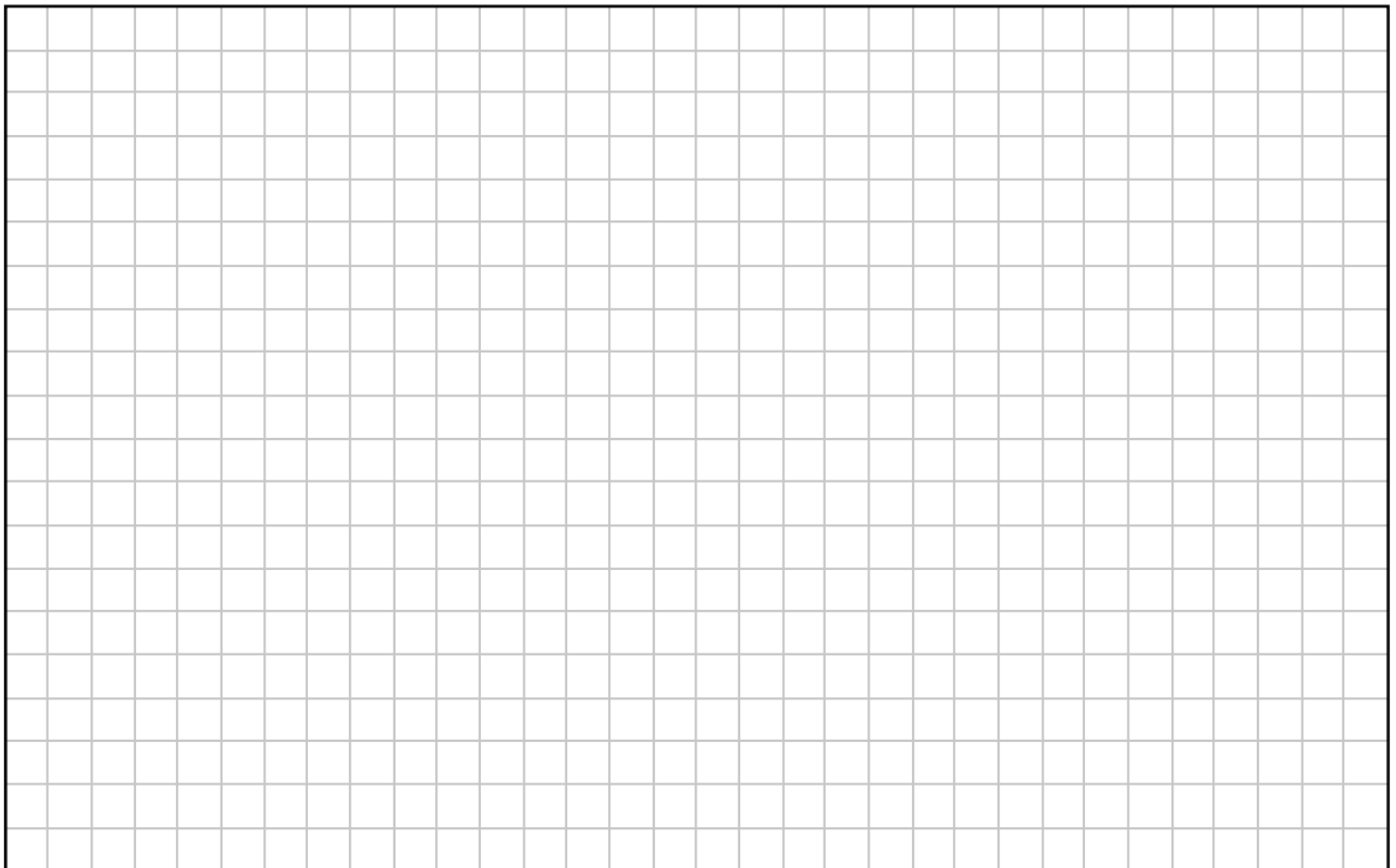
- (i) Find the centre and radius of c .

Centre: (,)

Radius: _____



- (ii) The point $(1, k)$ is on c . Find the two possible values of k .



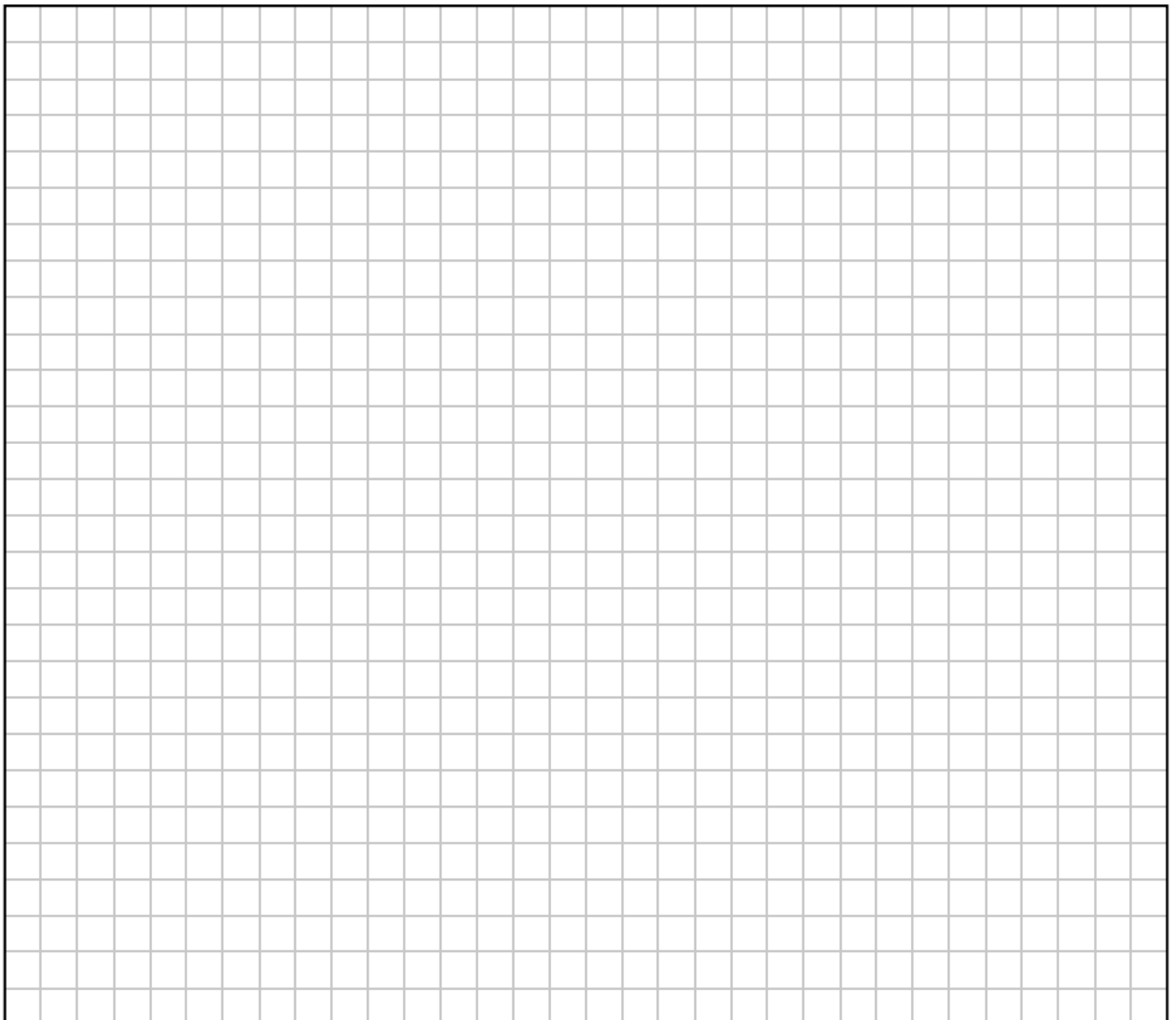
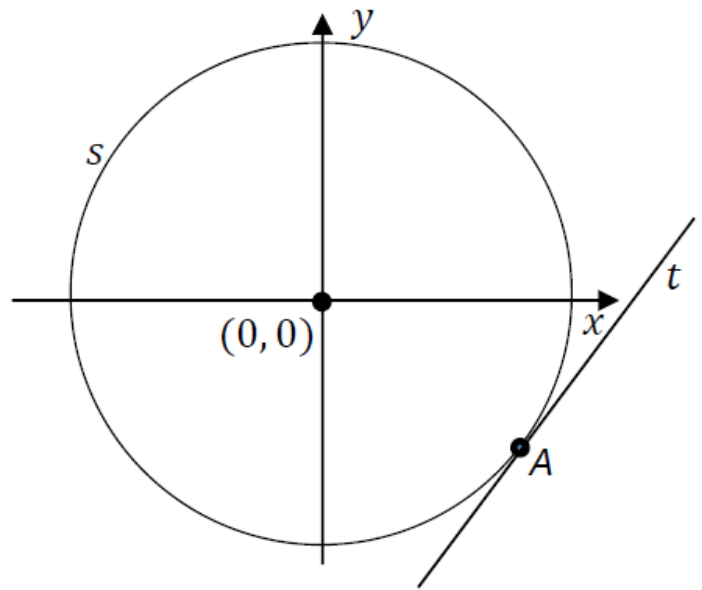
► 2020 LCOL Paper 2 – Question 4 (b)

The circle s has equation $x^2 + y^2 = 13$.

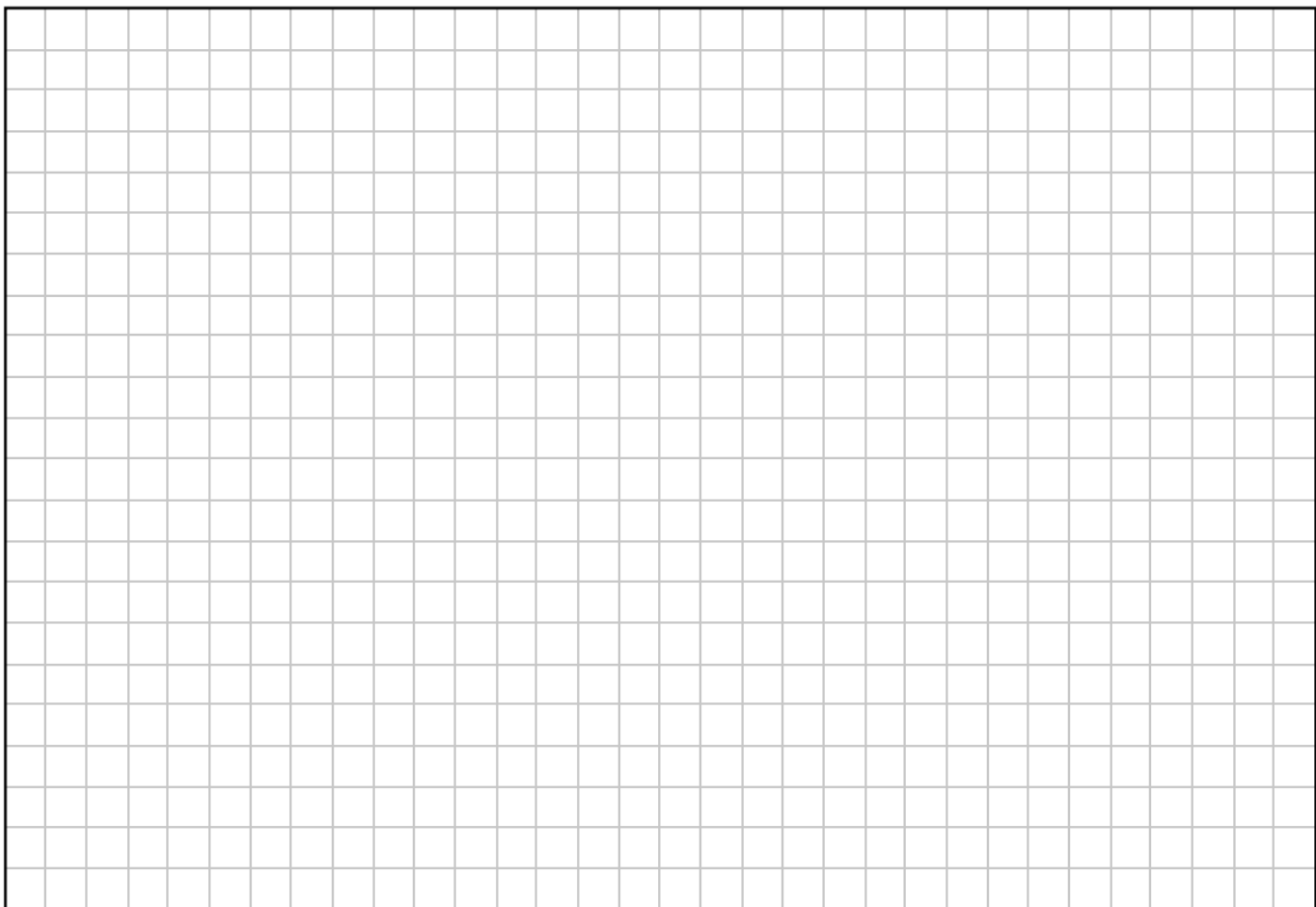
The point $A(3, -2)$ is on s .

Find the equation of t , the tangent to the circle at the point A .

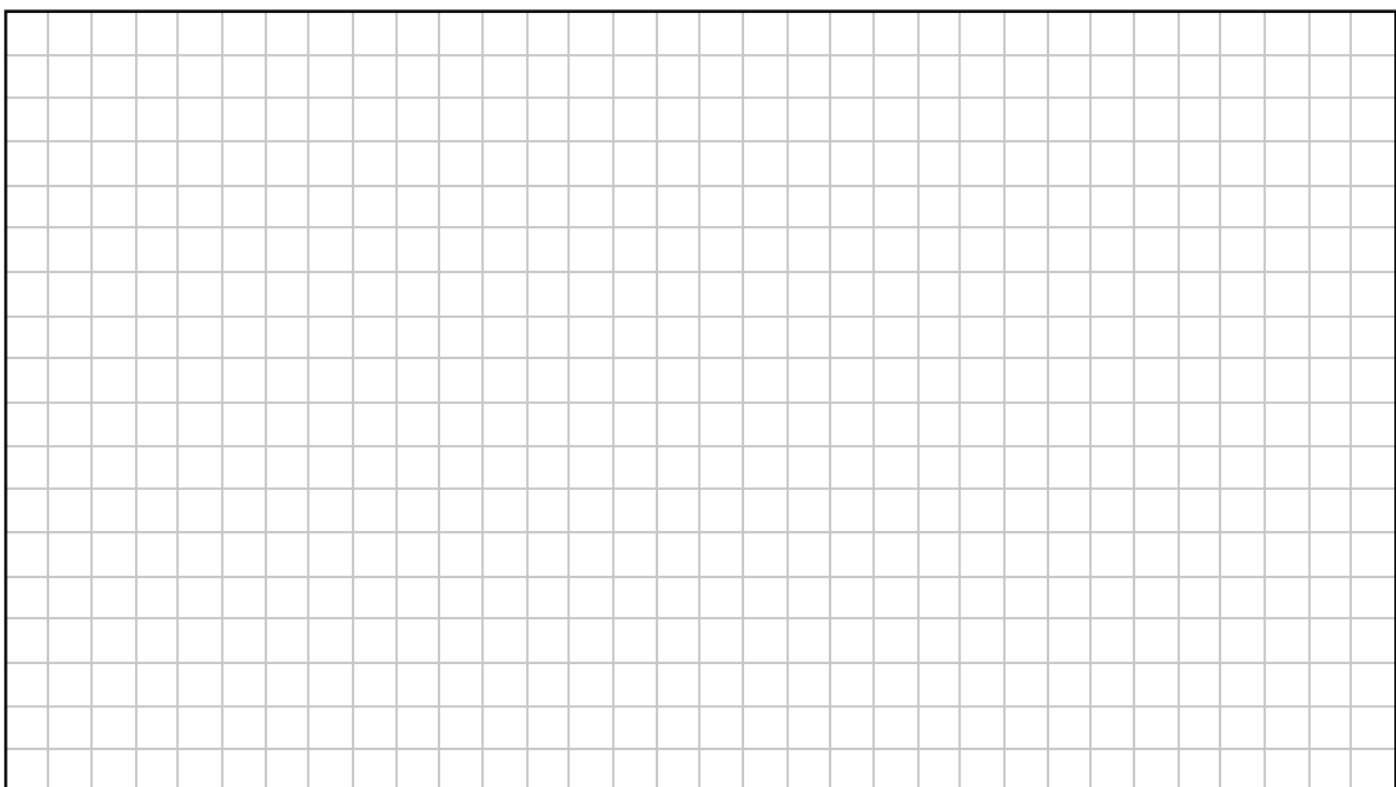
Give your answer in the form $ax + by + c = 0$, where $a, b, c \in \mathbb{Z}$.



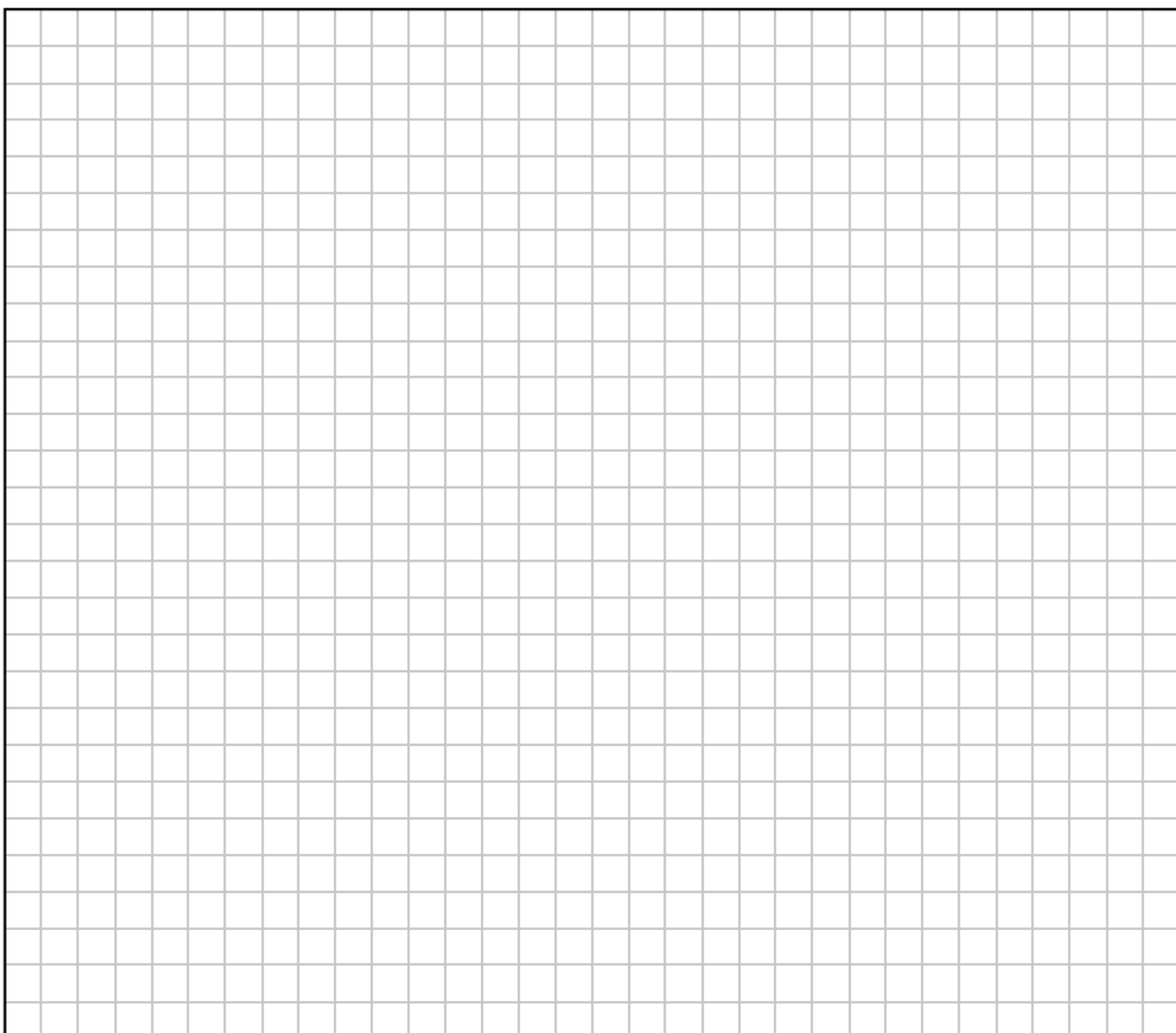
(c) Find the length of the **radius** of c .



(d) Find the equation of circle c .



- (d) Find the equation of the line that is a tangent to the circle w at A .
Give your answer in the form $ax + by + c = 0$, where a, b , and $c \in \mathbb{Z}$.

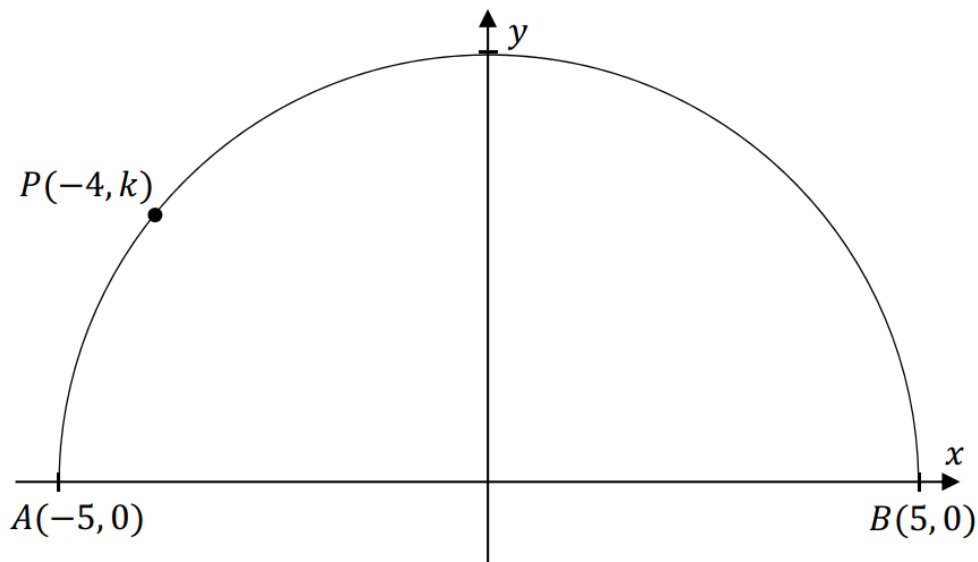


► 2017 LCOL Paper 2 – Question 2

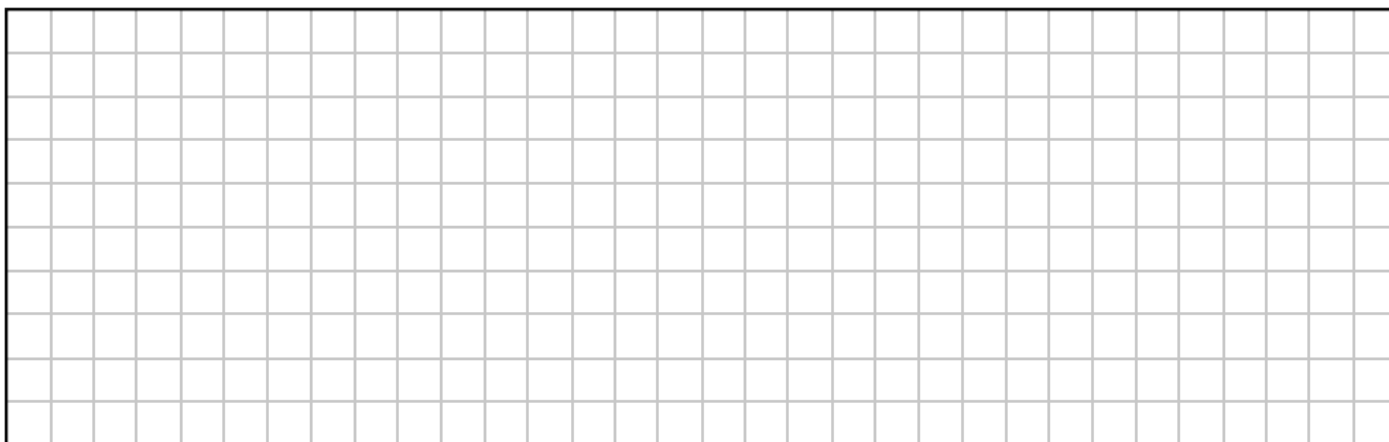
- (a) The circle c has centre $(0, 0)$ and radius 5 units. Write down the equation of c .

Equation of c : _____

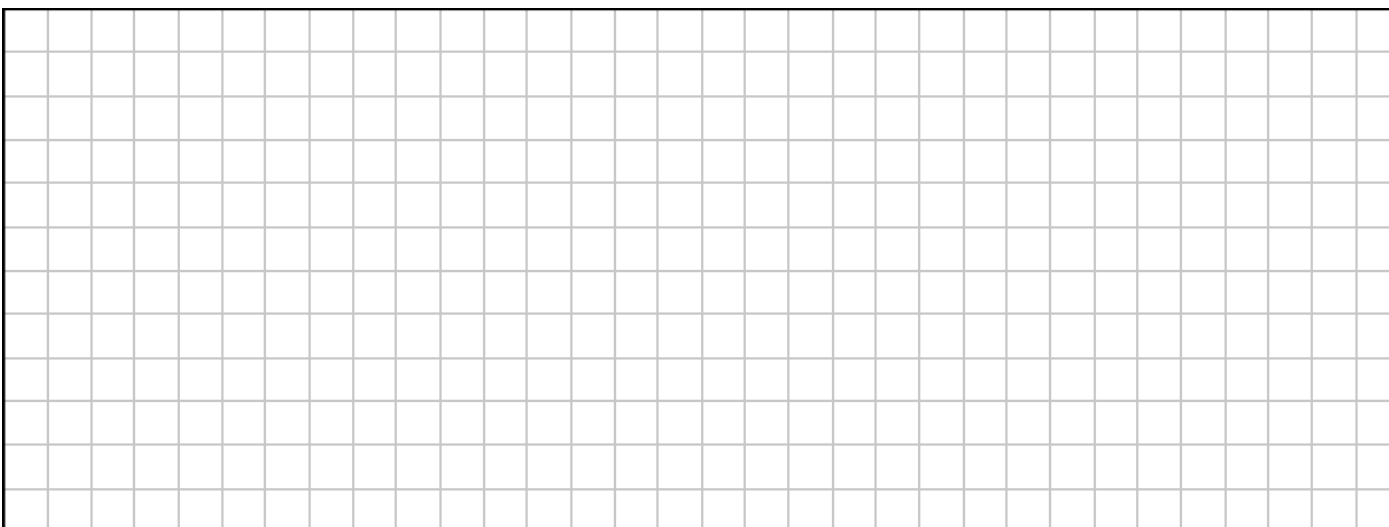
- (b) The diagram shows a semi-circle which is part of c .



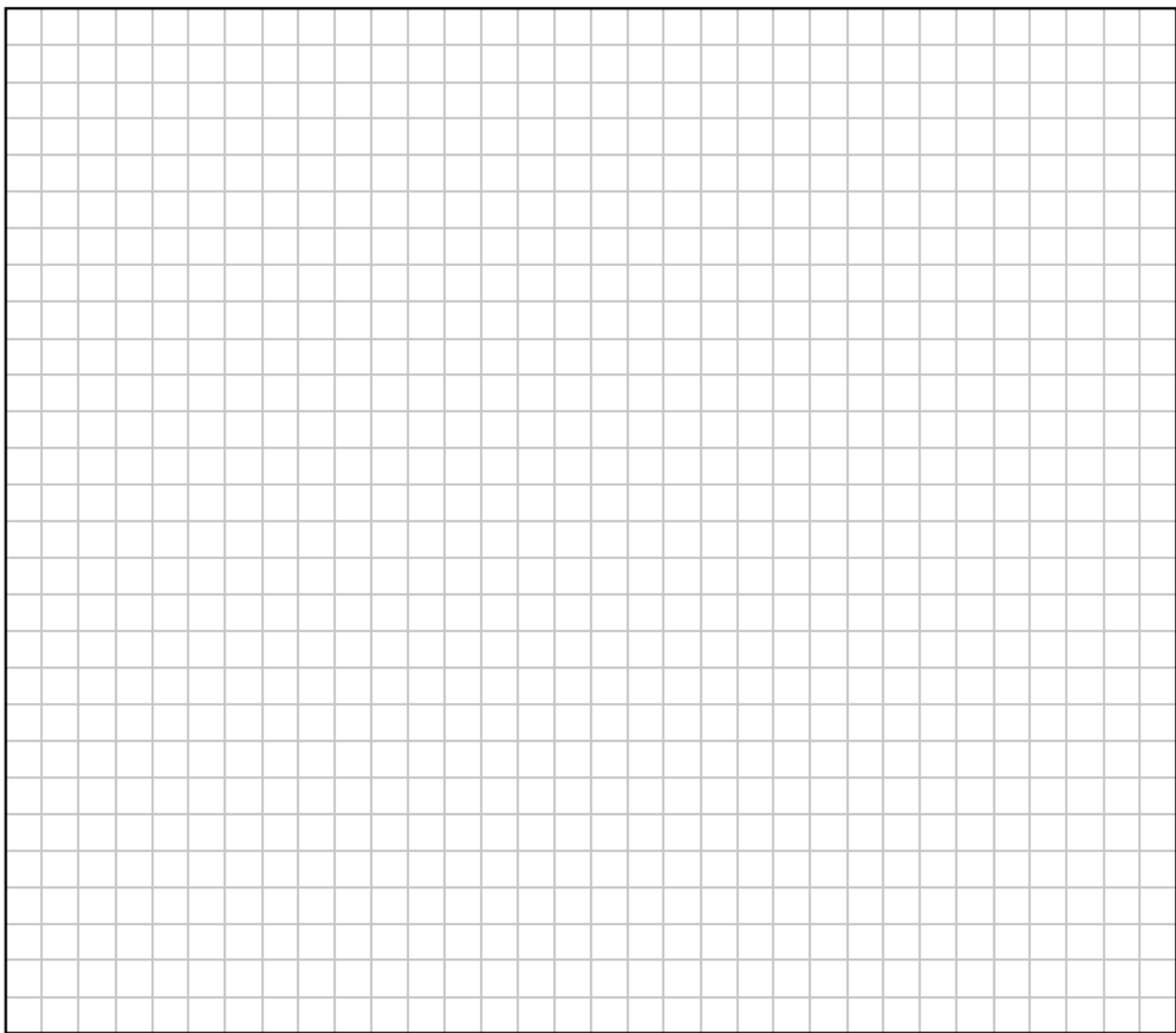
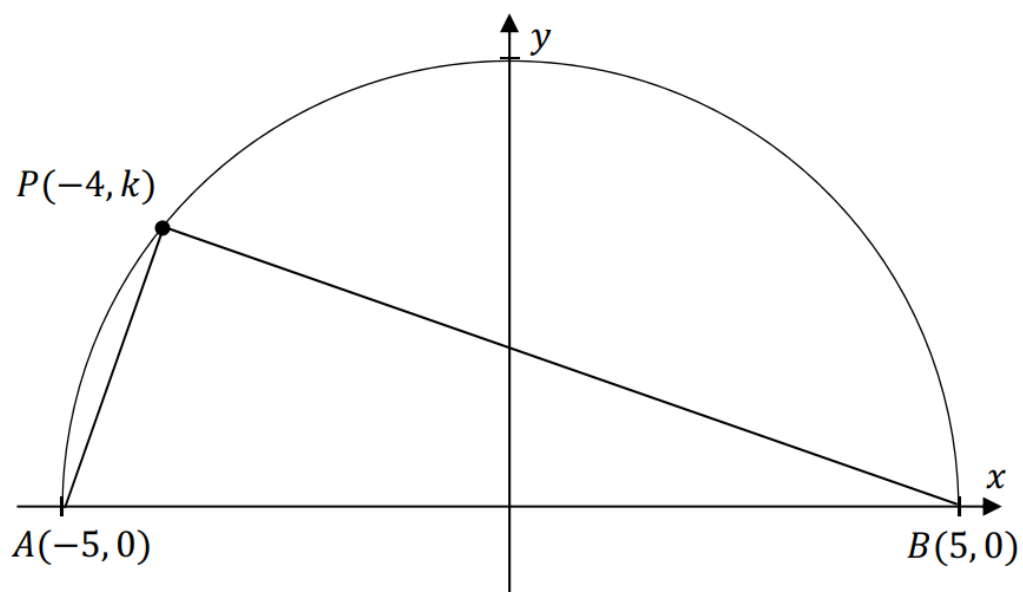
- (i) The point $P(-4, k)$, $k > 0$, is on the semi-circle. Find the value of k .



- (ii) Show that the triangle ABP is right-angled at P .

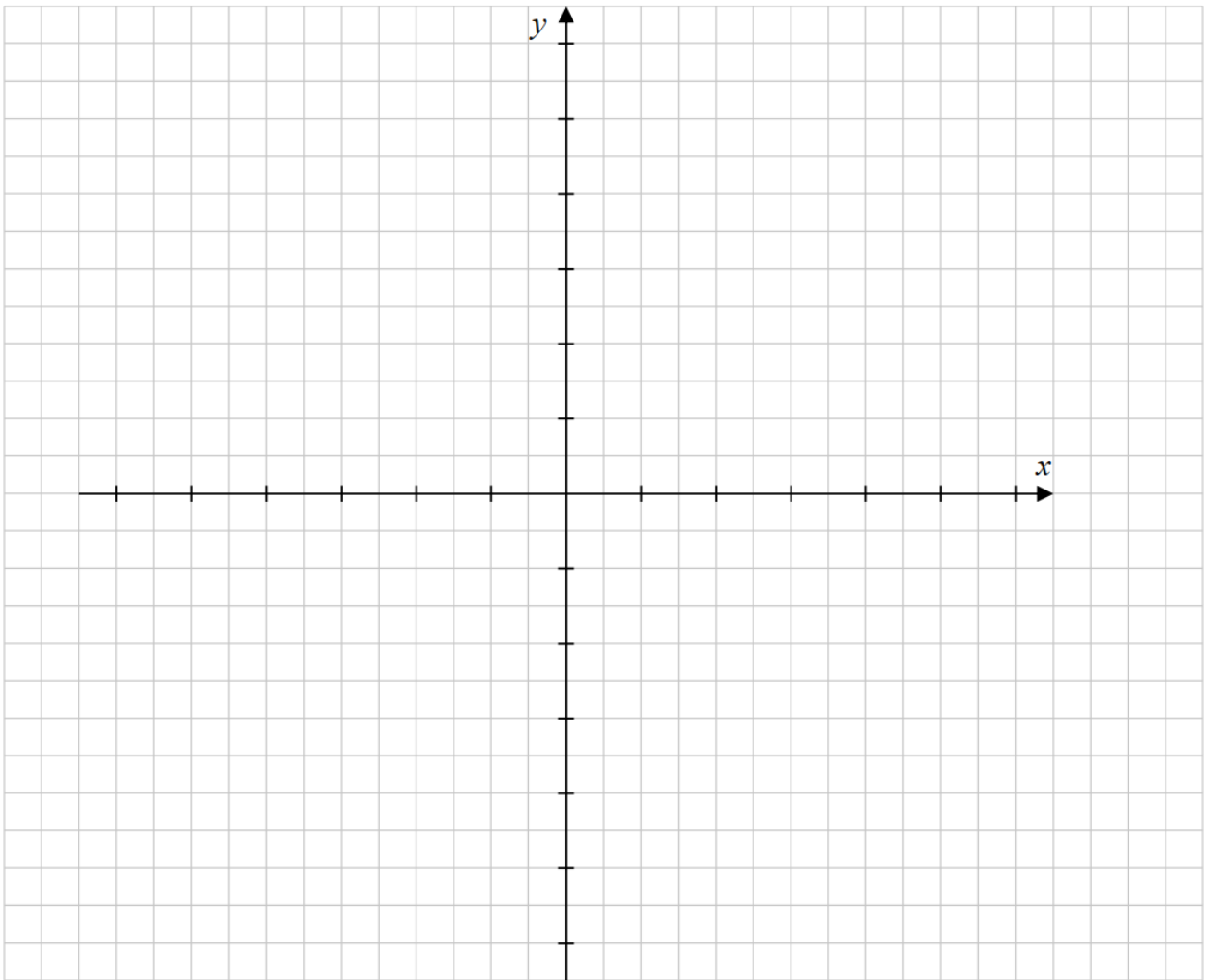


- (c) Find the area of the region which is inside the semi-circle but outside the triangle ABP .
Give your answer, in square units, correct to 2 decimal places.

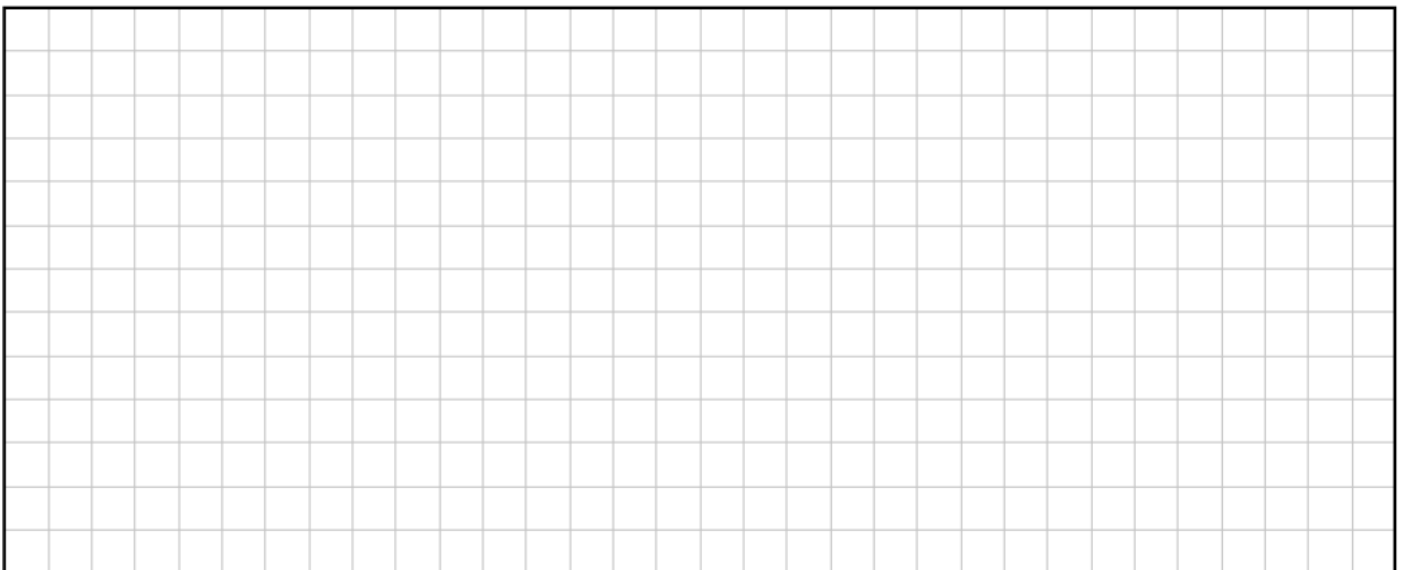


► 2015 LCOL Paper 2 – Question 3

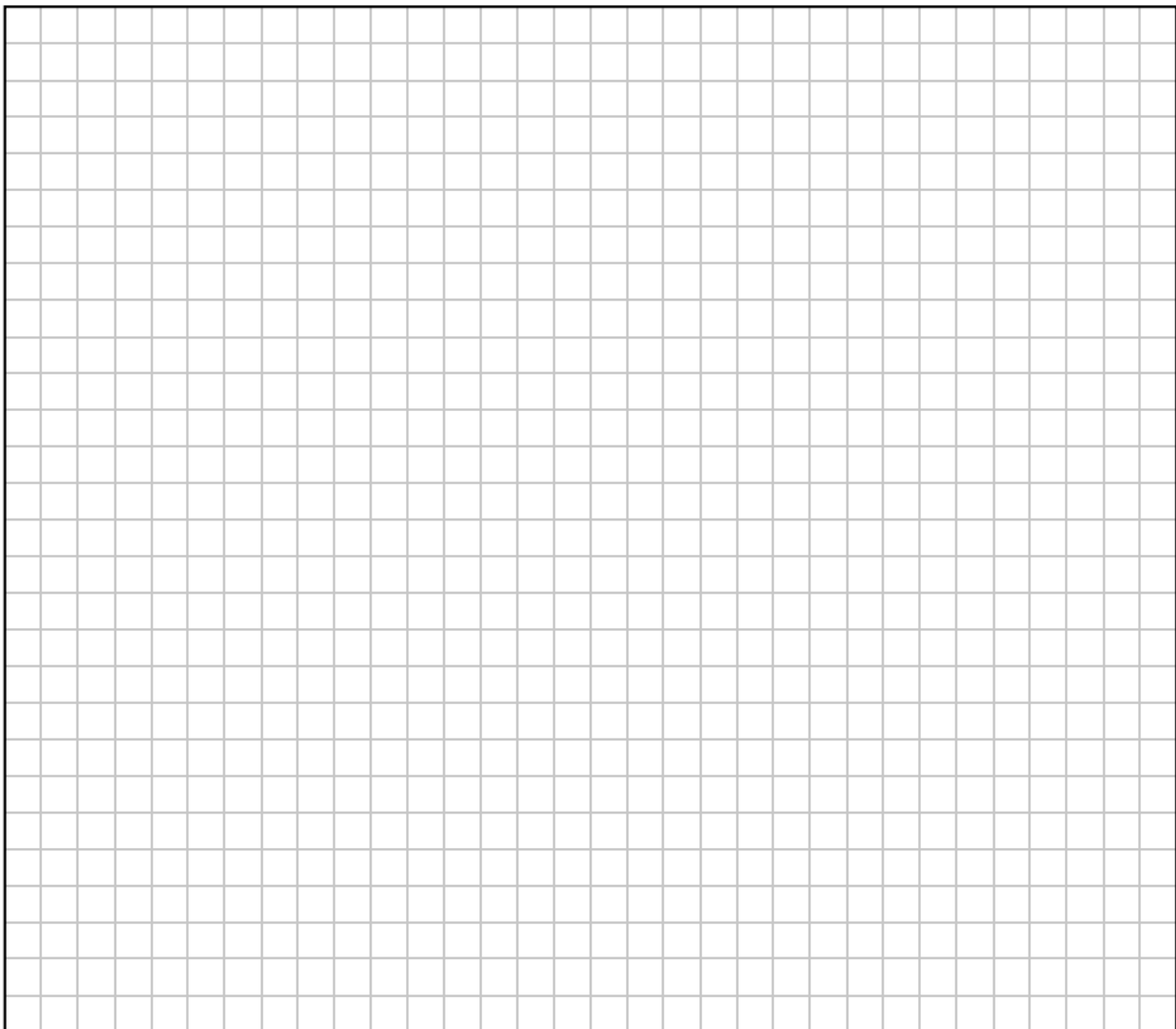
(a) Draw the circle $c: x^2 + y^2 = 25$. Show your scale on both axes.



(b) Verify, using algebra, that $A(-4, 3)$ is on c .



(c) Find the equation of the circle with centre $(-4, 3)$ that passes through the point $(3, 4)$.



► 2014 LCOL Paper 2 – Question 3

(a)

(i) The circle c has equation $(x + 2)^2 + (y - 3)^2 = 100$

Write down the co-ordinates of A , the centre of c .

$A(\quad , \quad)$

Write down r , the length of the radius of c .

$r = \underline{\hspace{2cm}}$

(ii) Show that the point $P(-8, 11)$ is on the circle c .

(b)

(i) Find the slope of the radius $[AP]$.

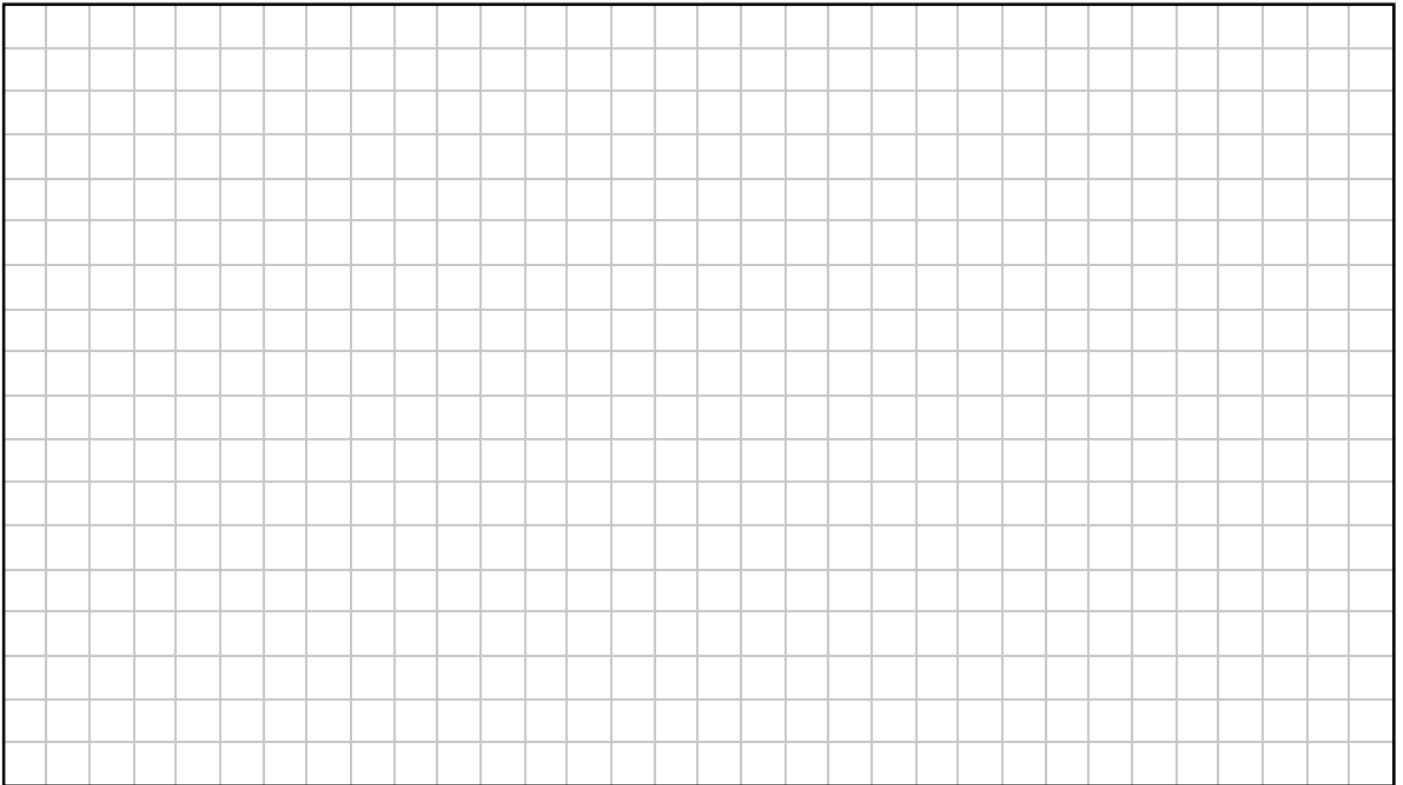
(ii) Hence, find the equation of t , the tangent to c at P .

(c) A second line k is a tangent to c at the point Q and $k \parallel t$. Find the co-ordinates of Q .

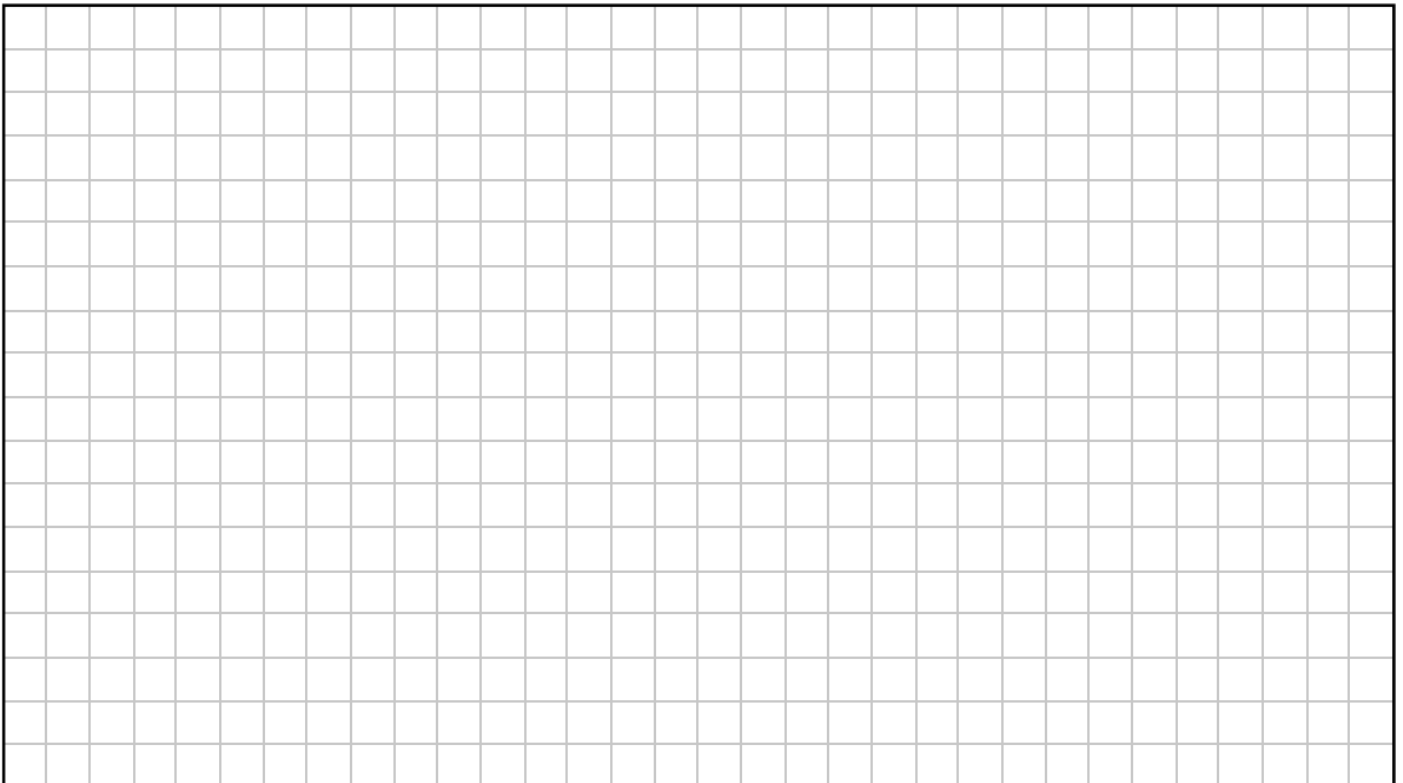
► 2014 LCOL Sample Paper 2 – Question 4

The circle c has centre $P(-2, -1)$ and passes through the point $Q(3, 1)$.

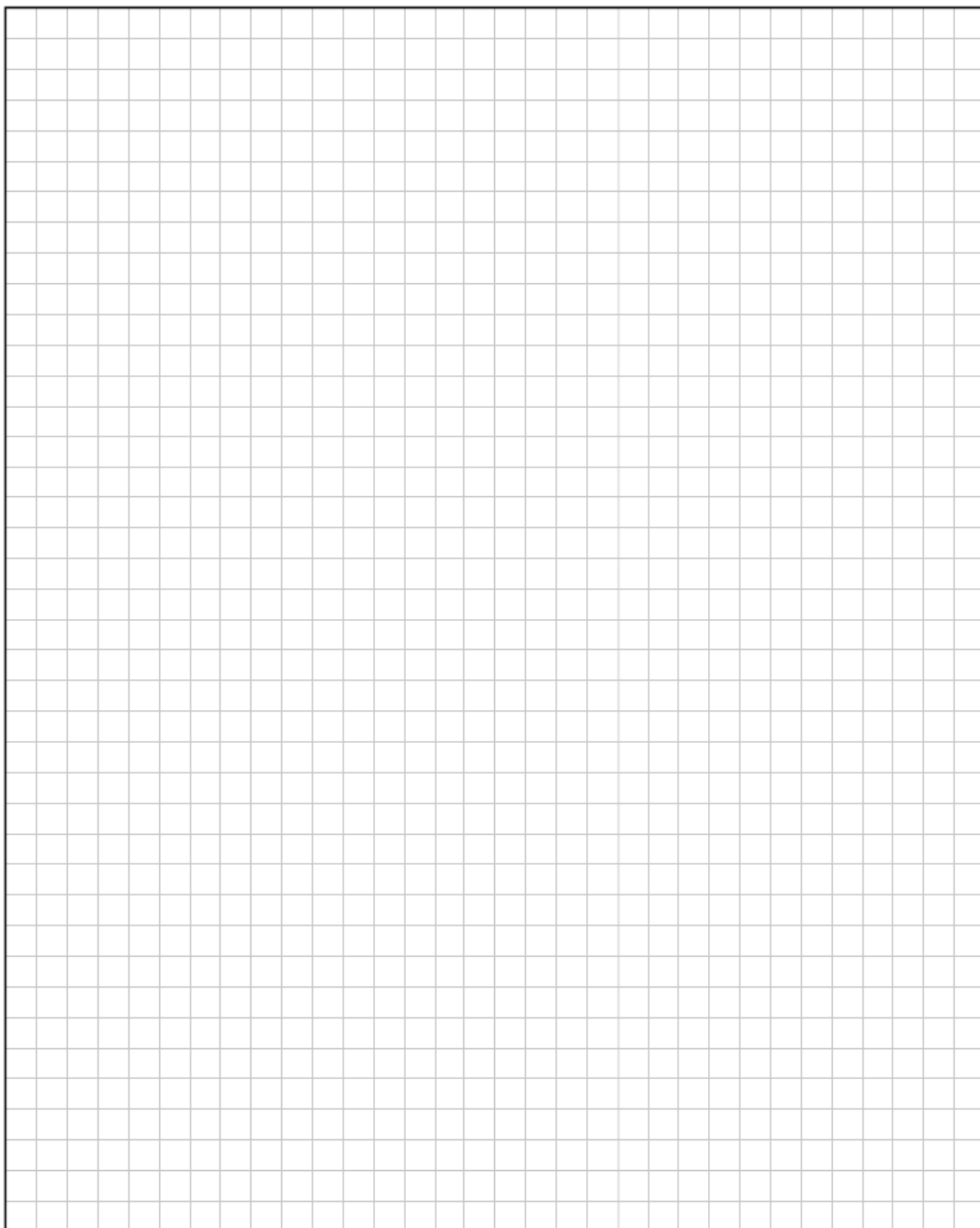
(a) Show c , P , and Q on a co-ordinate diagram.



(b) Find the radius of c and hence write down its equation.



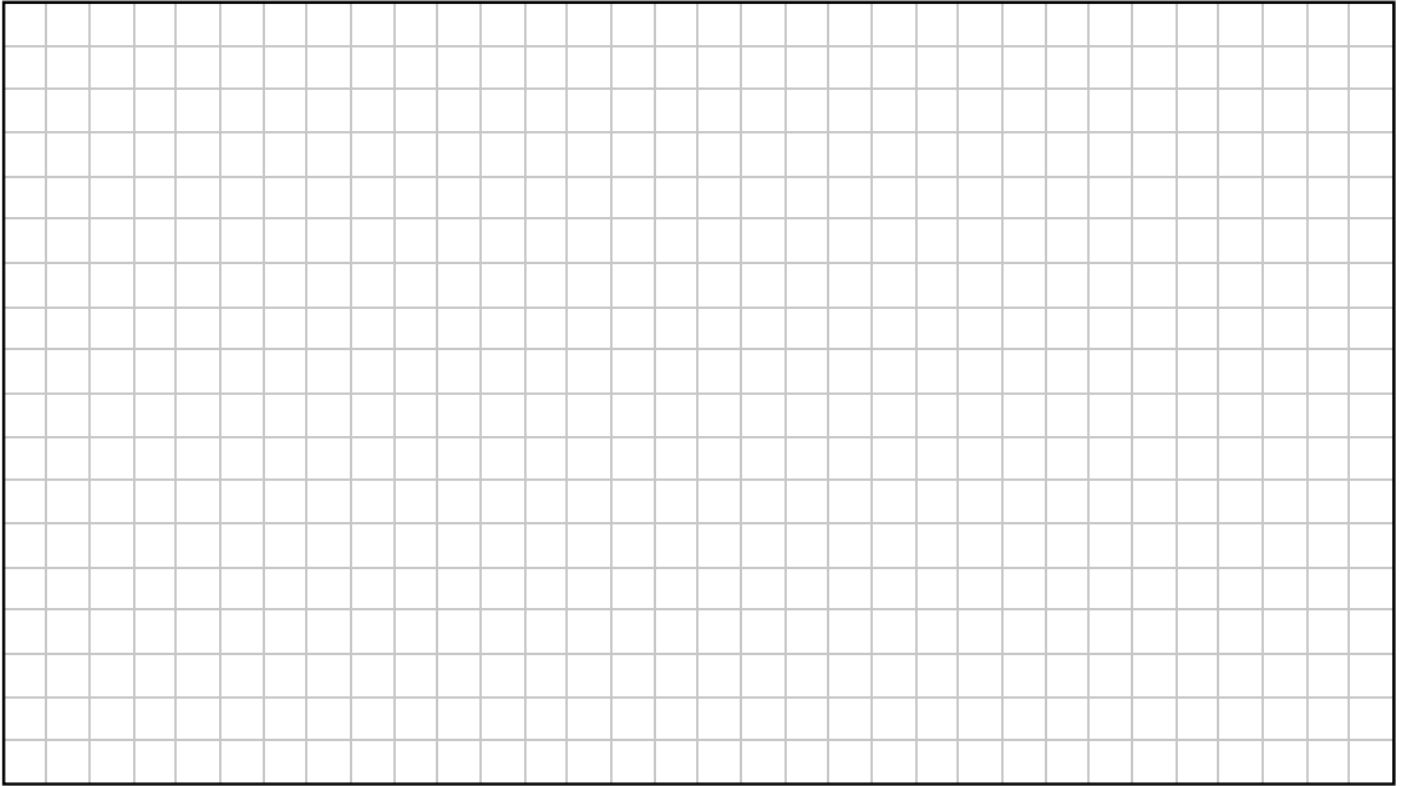
(c) R is the point $(1, 6)$. By finding the slopes of PQ and QR , show that QR is a tangent to c .



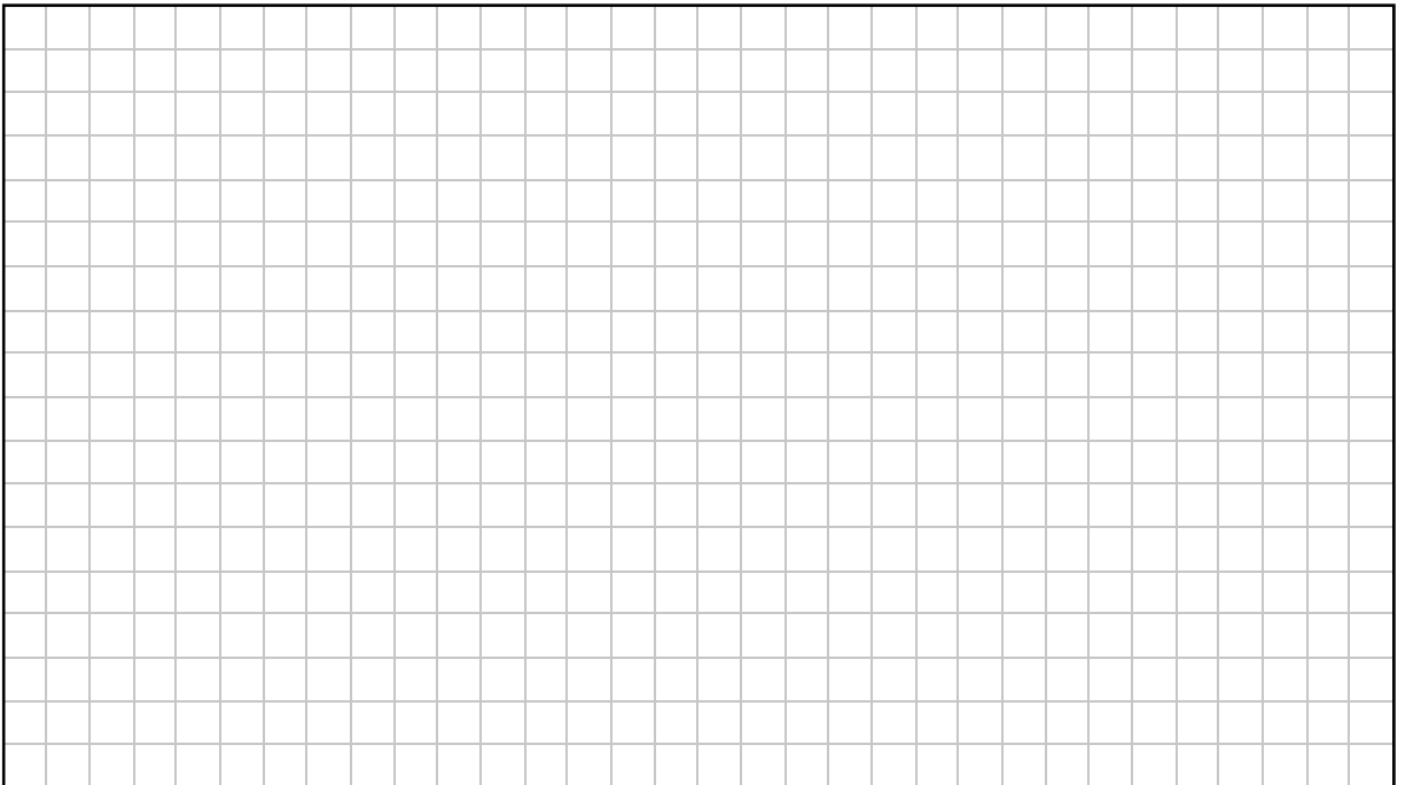
The two circles touch at $P(-3, 4)$.

P is on the line joining the two centres.

(c) Find the equation of c_2 .

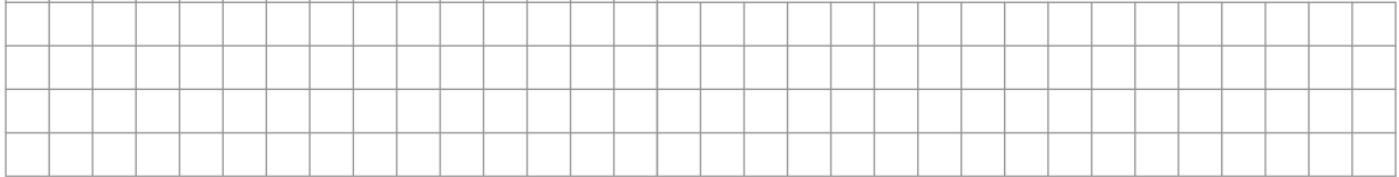
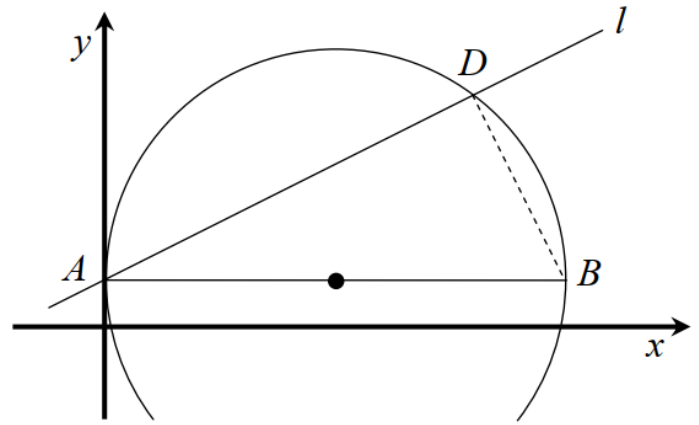
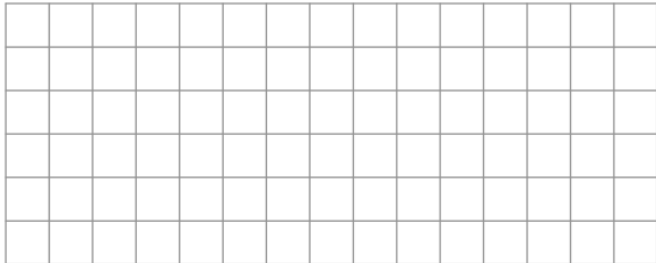


(d) Find the equation of the common tangent at P .



► 2012 LCOL Sample Paper 2 – Question 3

- (a) The point A has co-ordinates $(0, 1)$.
The line l passes through A and has slope $\frac{1}{2}$.
Find the equation of l .



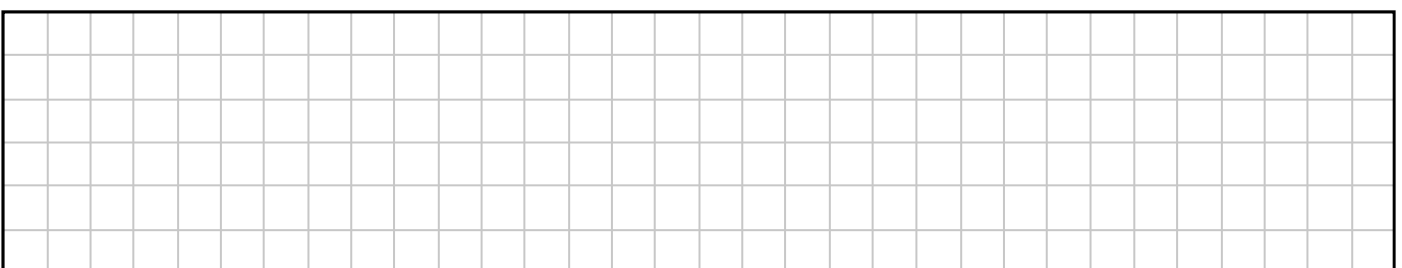
- (b) $[AB]$ is the diameter of a circle, where B is the point $(10, 1)$. Find the centre and radius of the circle, and hence write down its equation.

Centre: (,); Radius: _____ Equation: _____

- (c) The line l crosses the circle at the points A and D .
Write down the slope of DB , and explain how you know that this is the slope.

Answer: The slope of DB is : _____

Explanation:

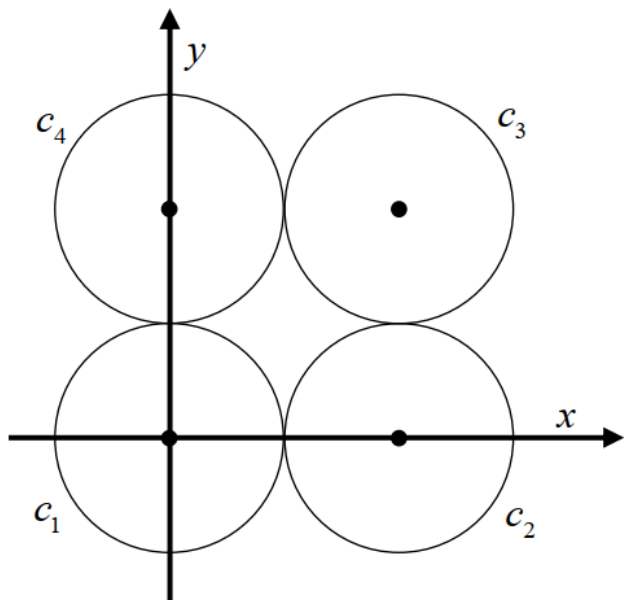


► 2012 LCOL Sample Paper 2 – Question 4 (b)

The diagram shows four circles of equal radius.

The circles are touching as shown.

The equation of c_1 is $x^2 + y^2 = 9$.



(i) Write down the radius of c_1 .

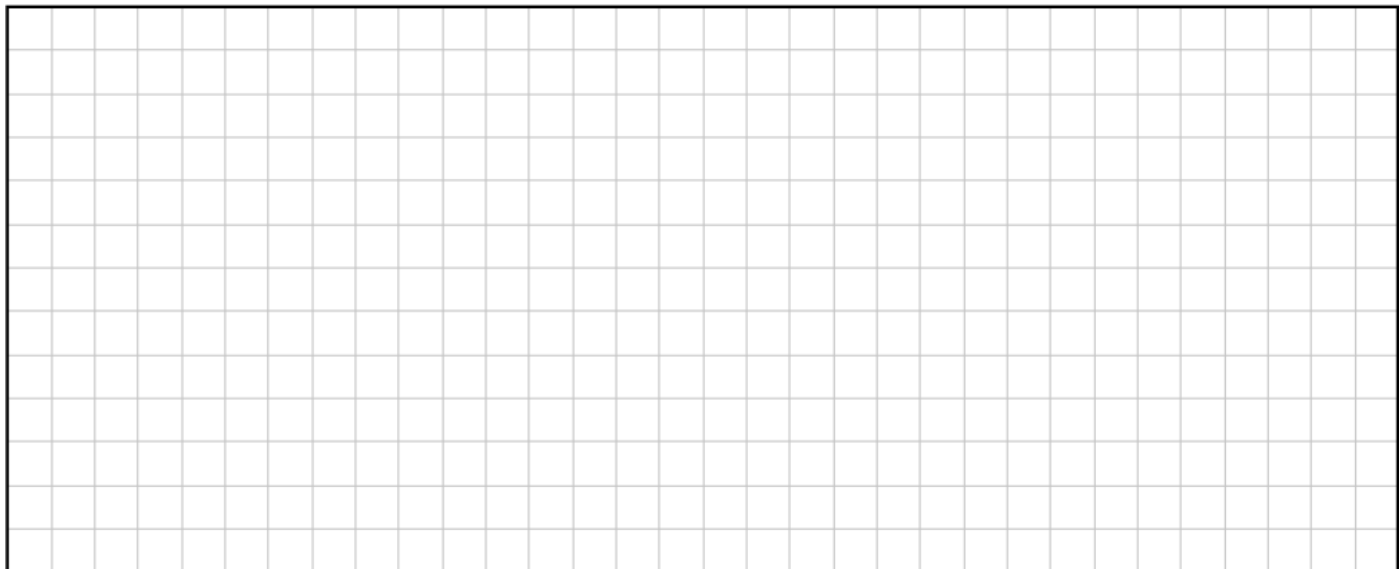
Answer: _____

(ii) Write down the co-ordinates of the centre of c_3 .

Answer: _____

(iii) Write down the equation of c_3 .

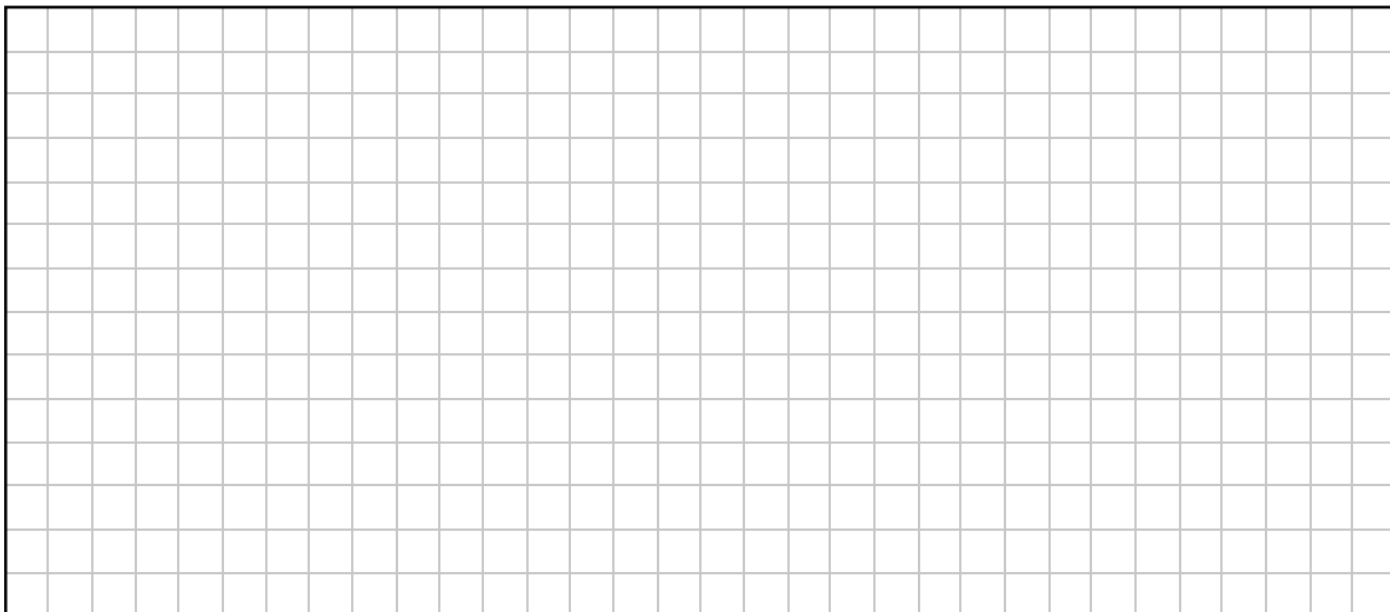
Answer: _____



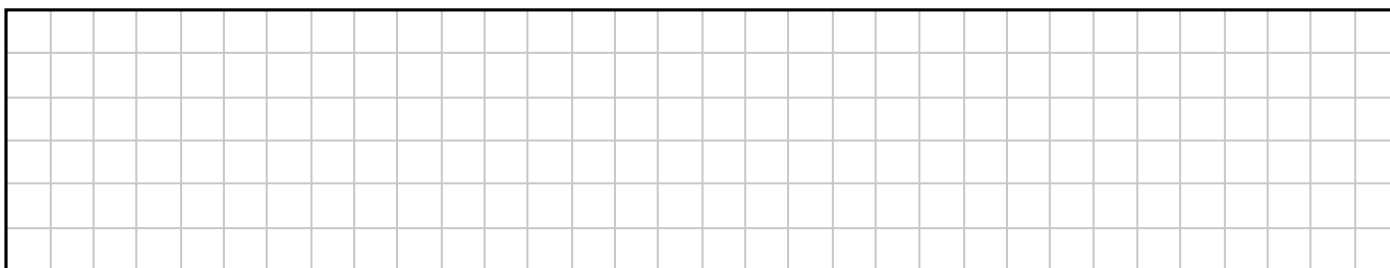
► 2011 LCOL Paper 2 – Question 2

A circle c_1 has centre $(0, 0)$ and diameter 8 units.

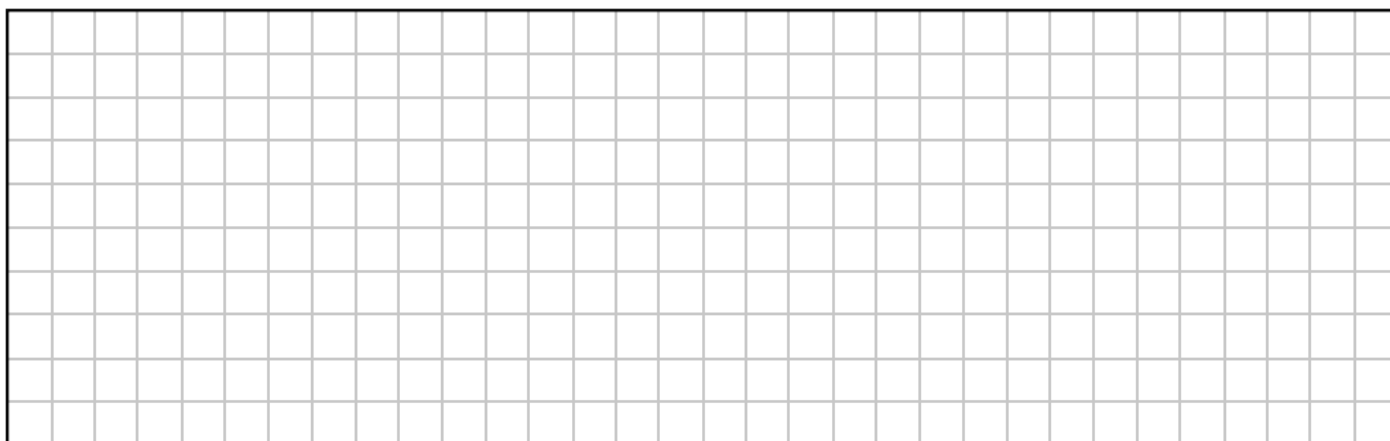
(a) Show c_1 on a co-ordinate diagram.



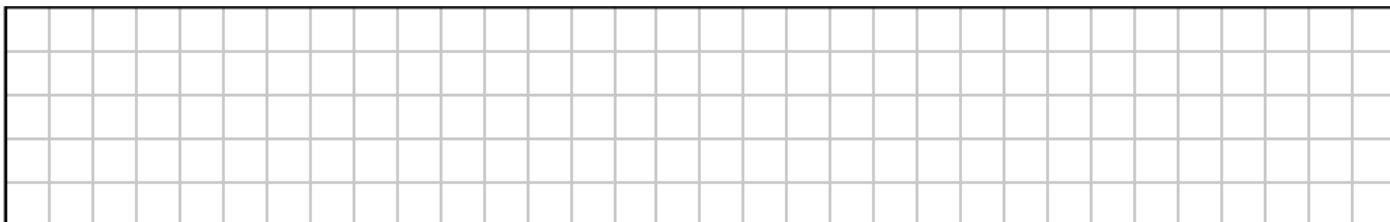
(b) Find the equation of c_1 .



(c) Prove that the point $(3, 2)$ is inside c_1 and that the point $(3, 3)$ is outside it.



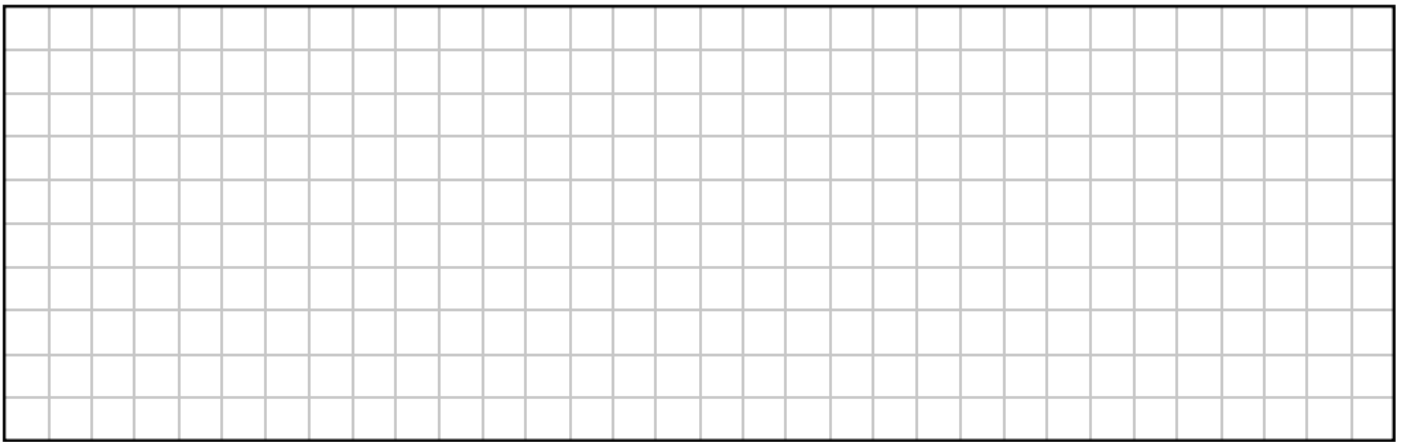
(d) Another circle, c_2 , has centre $(0, 1)$ and just touches the circle c_1 . Show on your diagram in part (a) above and find the equation of c_2 .



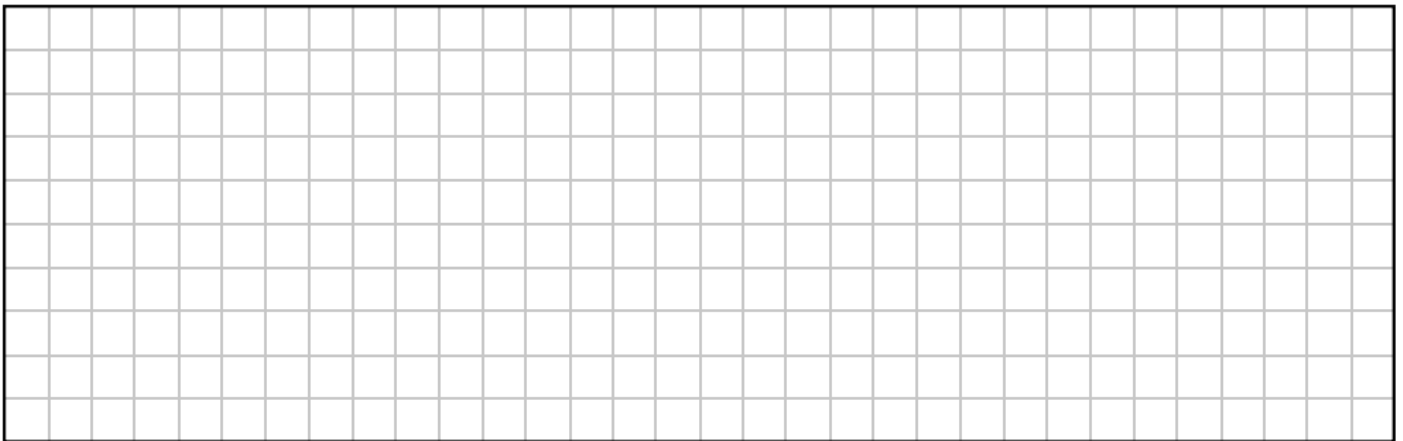
► 2010 LCOL Paper 2 – Question 3

(a) A circle has centre $(0, 0)$ and passes through the point $(3, 4)$.

(i) Find the equation of the circle.



(ii) Find the co-ordinates of the two points at which the circle crosses the y -axis.



- (b) A circle has centre $(2, 4)$ and touches the y -axis.
Find the equation of the circle.

