1. Nov/2021/Paper_21/No.8

A is the point $(-2, 3)$ and B is the point $(4, 5)$.

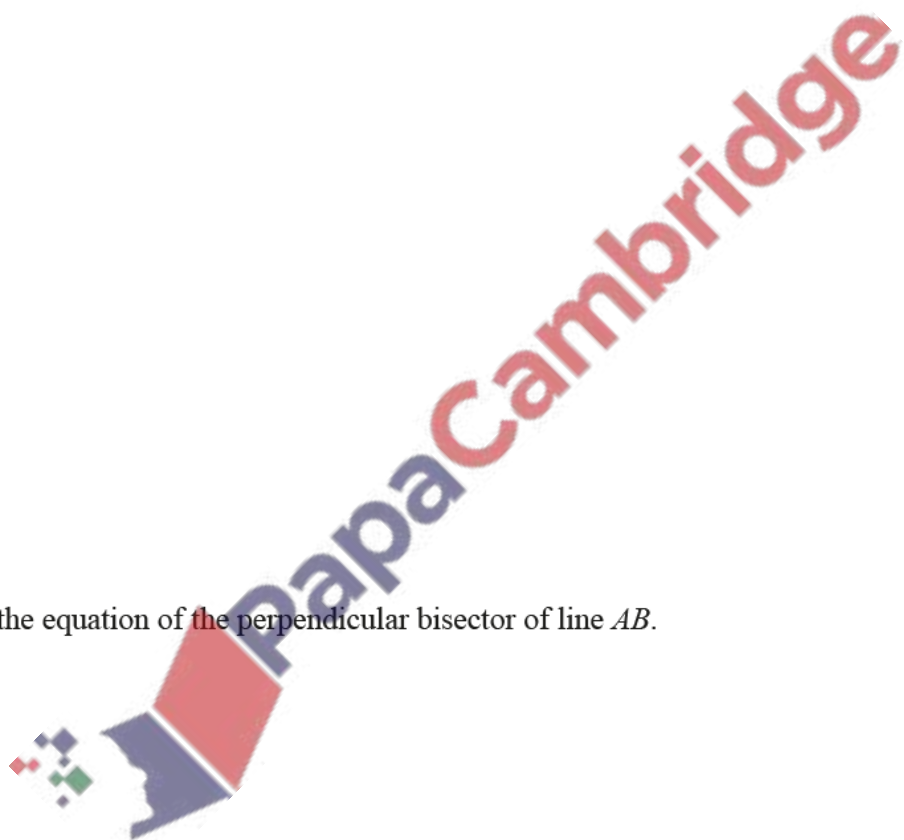**(a)** Find the coordinates of the midpoint of AB.

(....................... , ...) [1]

(b) Show that the equation of line AB is $3y = x + 11$.

[3]

(c) Find the equation of the perpendicular bisector of line AB.

.... [3]

(a) *P* is the point $(-5, 2)$, *Q* is the point $(3, 7)$ and $\overrightarrow{QR} = \begin{pmatrix} -4 \\ 6 \end{pmatrix}$.

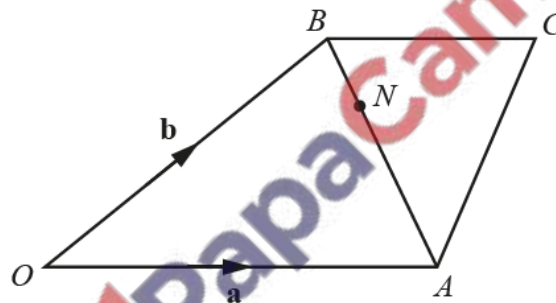   **(i)** Find the coordinates of the midpoint of *PQ*.

(..................... , ...) [1]

    (ii) Find the coordinates of point *R*.

(..................... , ...) [1]

    (iii) Find $\left| \overrightarrow{QR} \right|$.

$\left| \overrightarrow{QR} \right| =$ .... units [2]

(b)

NOT TO SCALE

OACB is a quadrilateral and *N* is a point on *AB*.
$\overrightarrow{OA} = \mathbf{a}$ and $\overrightarrow{OB} = \mathbf{b}$.
$\overrightarrow{OA} = 2\overrightarrow{BC}$ and $BN : NA = 1 : 3$.

Find, in terms of **a** and **b**, in its simplest form

(i) $\overrightarrow{AB}$,

$\overrightarrow{AB} =$ .... [1]

2

(ii) $\overrightarrow{NC}$.

$$\overrightarrow{NC} = \text{..}\quad [3]$$
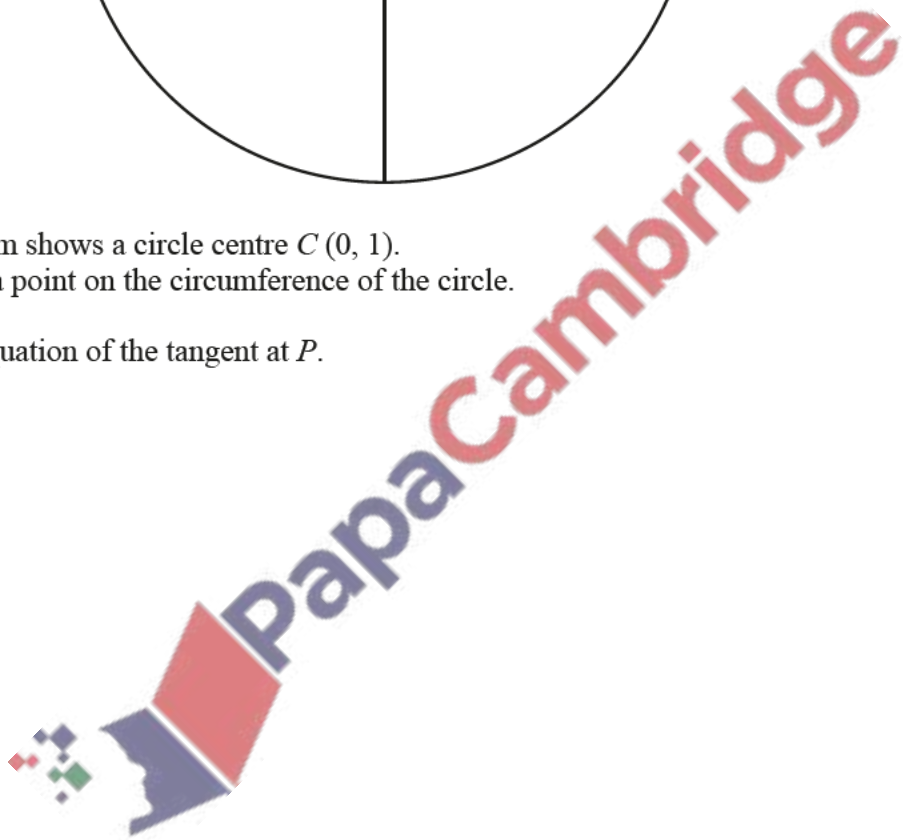
NOT TO SCALE
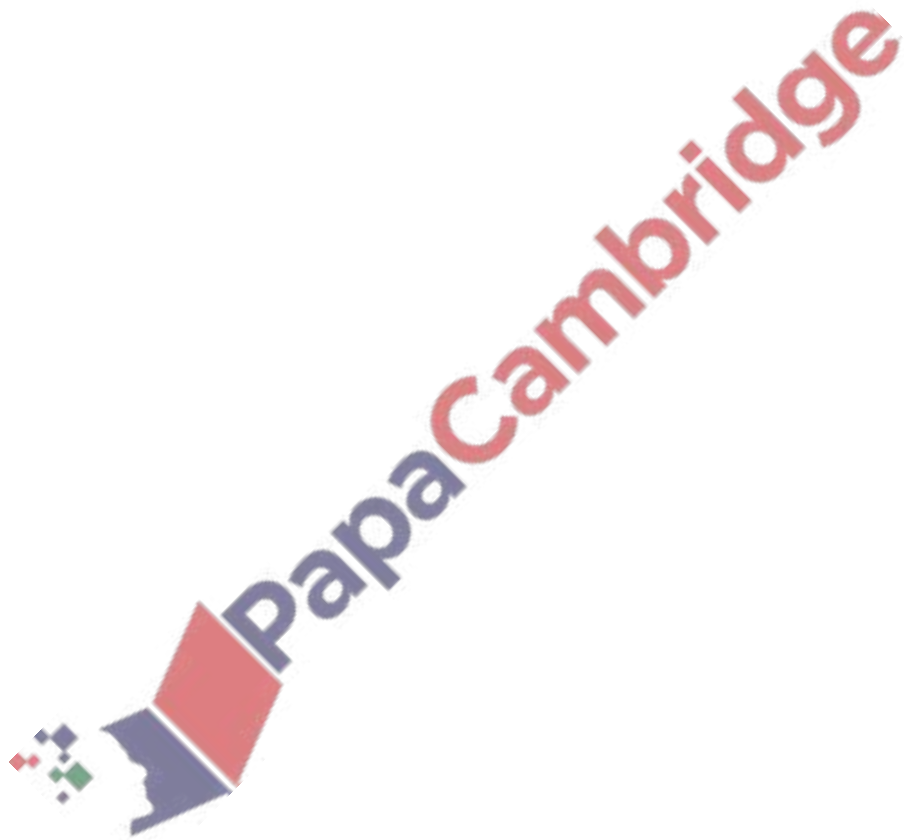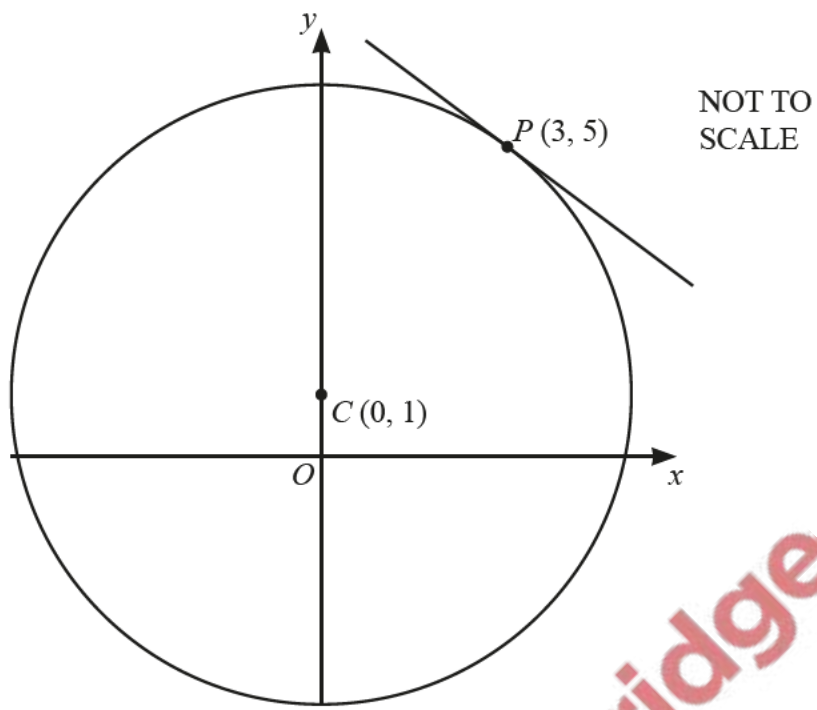
The diagram shows a circle centre C $(0, 1)$.
P $(3, 5)$ is a point on the circumference of the circle.

Find the equation of the tangent at P.
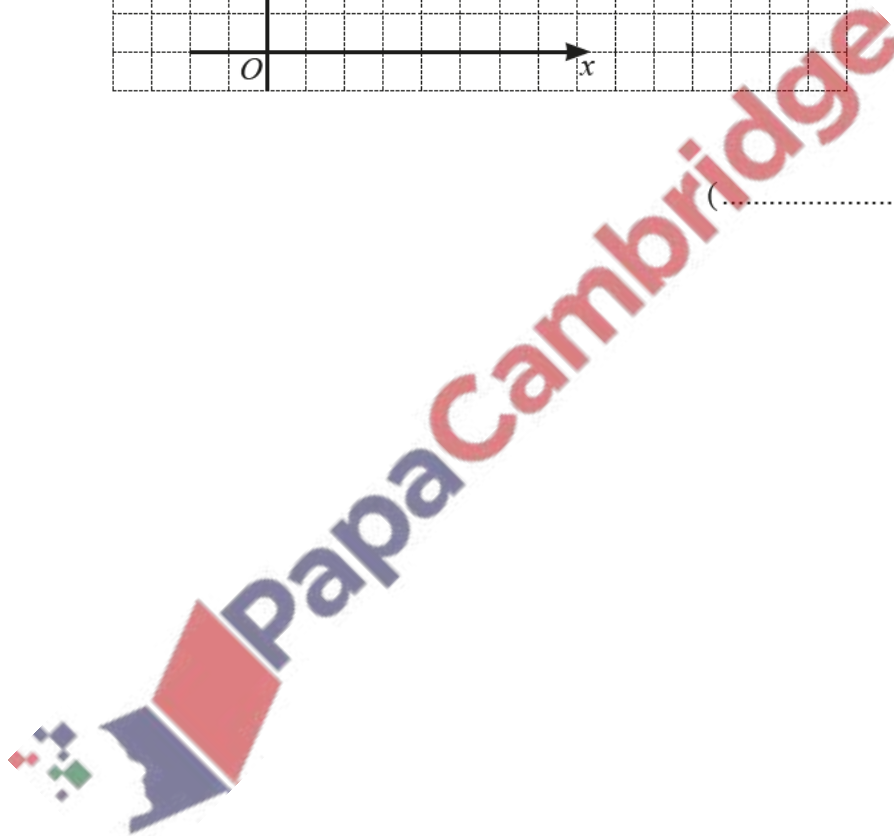
.... [4]

4

(a) *PQR* is an isosceles triangle with *PR = QR*.
P is the point (1, 5) and *Q* is the point (5, 1).
Angle *PRQ* is **not** a right angle.

Find the coordinates for one possible position of *R*.
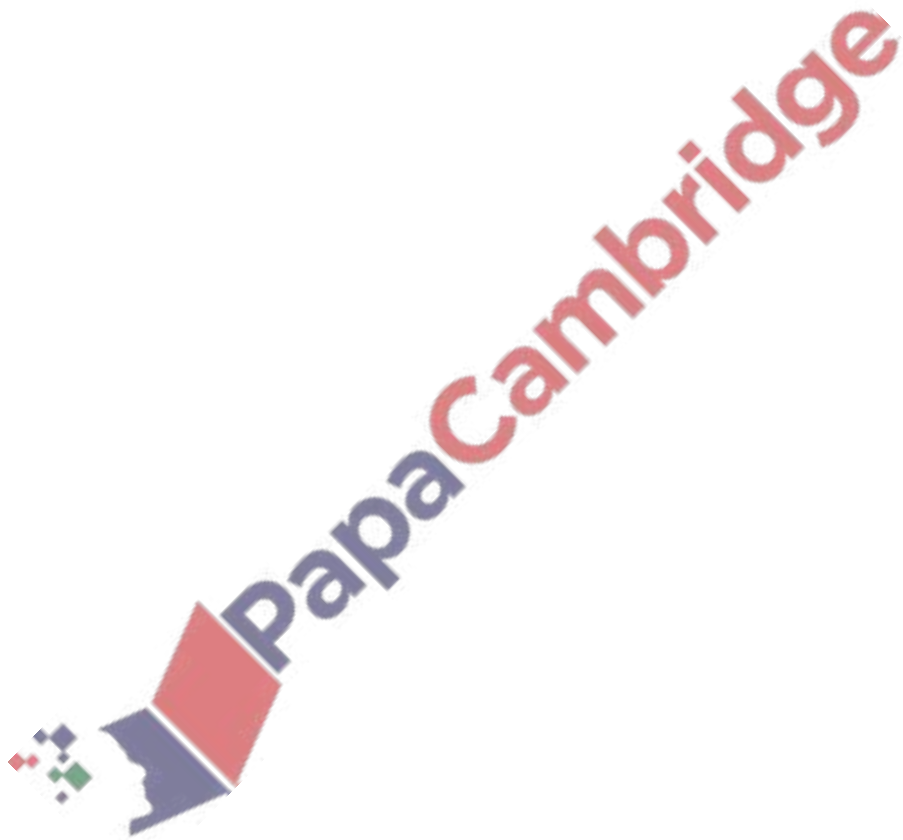You may use the grid to help you.
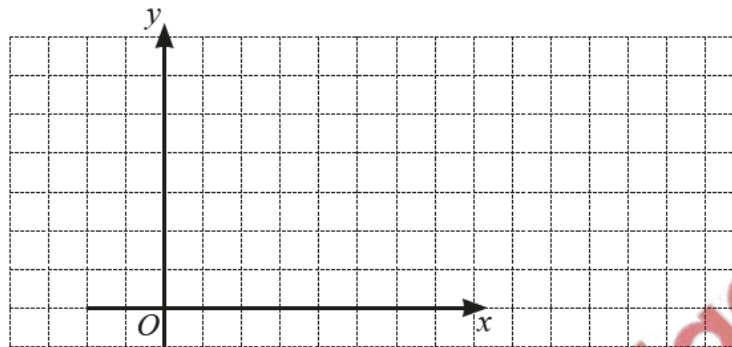
(.................... , ...) [2]

(c) *A* is the point $(-1, -5)$ and *B* is the point $(3, 3)$.

Find the equation of the line perpendicular to *AB* which passes through the midpoint of *AB*.

.... [5]