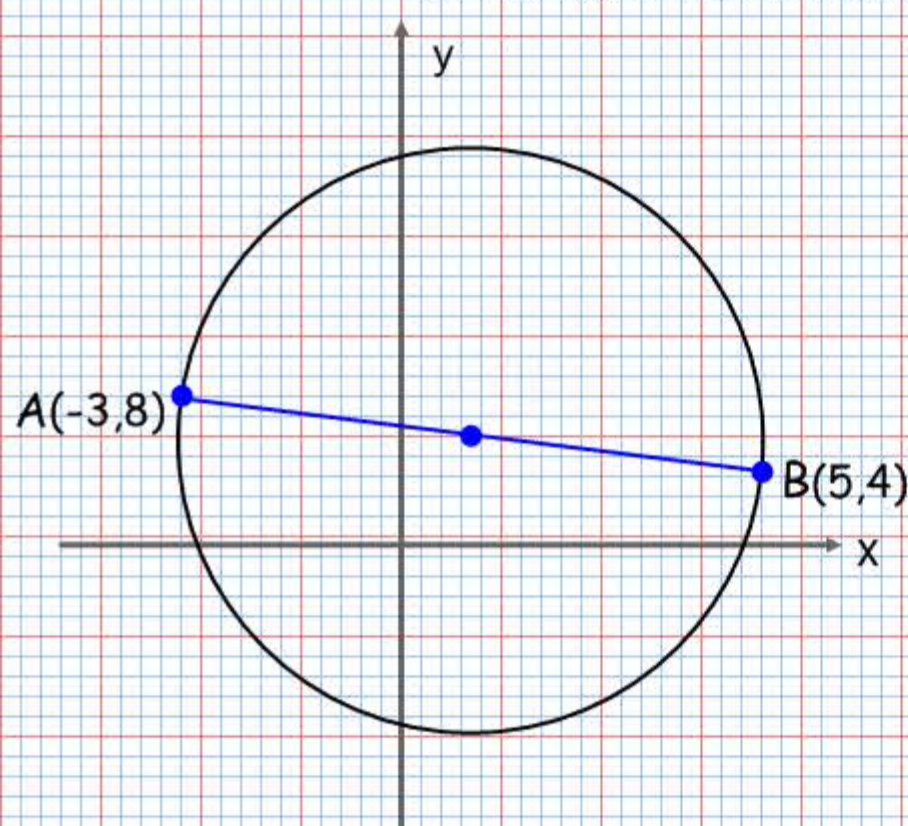


Exercises

①

The line AB is a diameter of a circle, where A and B are $(-3,8)$ and $(5,4)$ respectively. Find the coordinates of the centre of the circle.



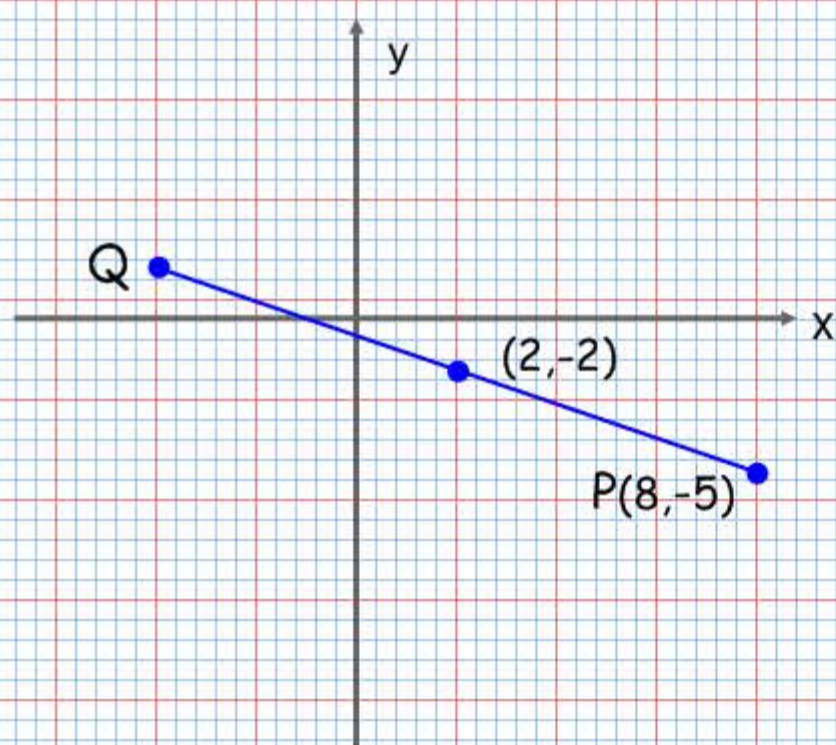
$$\left(\frac{x_2 + x_1}{2}, \frac{y_2 + y_1}{2} \right)$$

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

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

②

The line PQ is a diameter of the circle centre $(2,-2)$. Given P is $(8,-5)$ find the coordinates of Q.



$$\left(\frac{x_2 + x_1}{2}, \frac{y_2 + y_1}{2} \right)$$

$$\left(\underline{\hspace{2cm}}, \underline{\hspace{2cm}} \right) =$$

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

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

③

The line AB is a diameter of a circle centre C, where A and B are $(-1,4)$ and $(5,2)$ respectively. The line l passes through C and is perpendicular to AB. Find the equation of l .

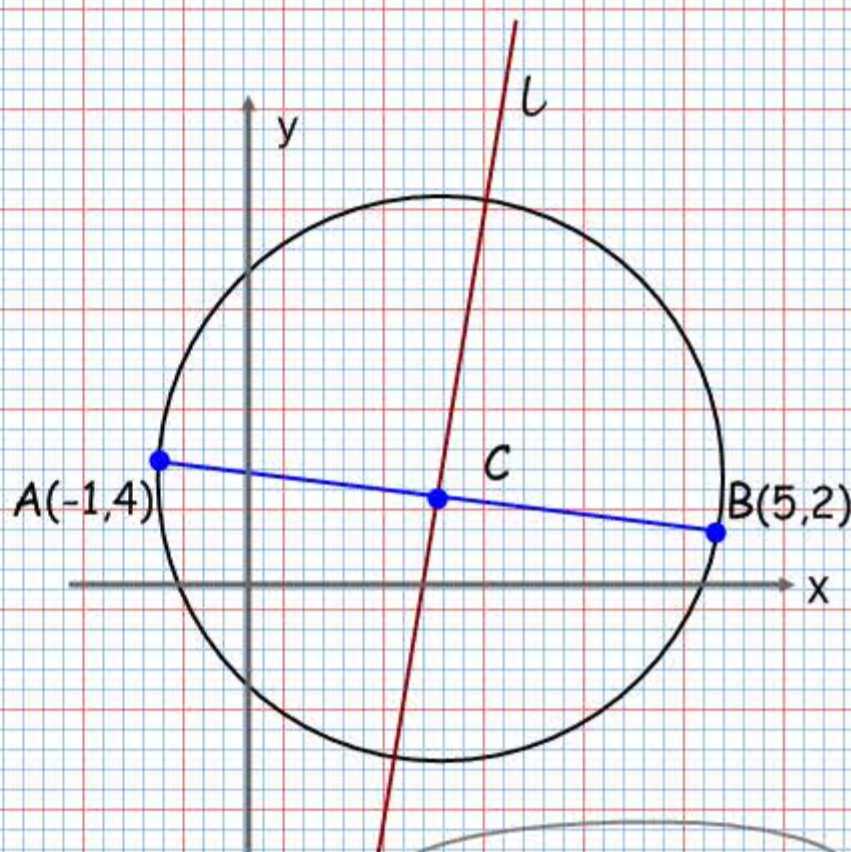
$$\left(\frac{x_2 + x_1}{2}, \frac{y_2 + y_1}{2} \right)$$

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

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

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

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



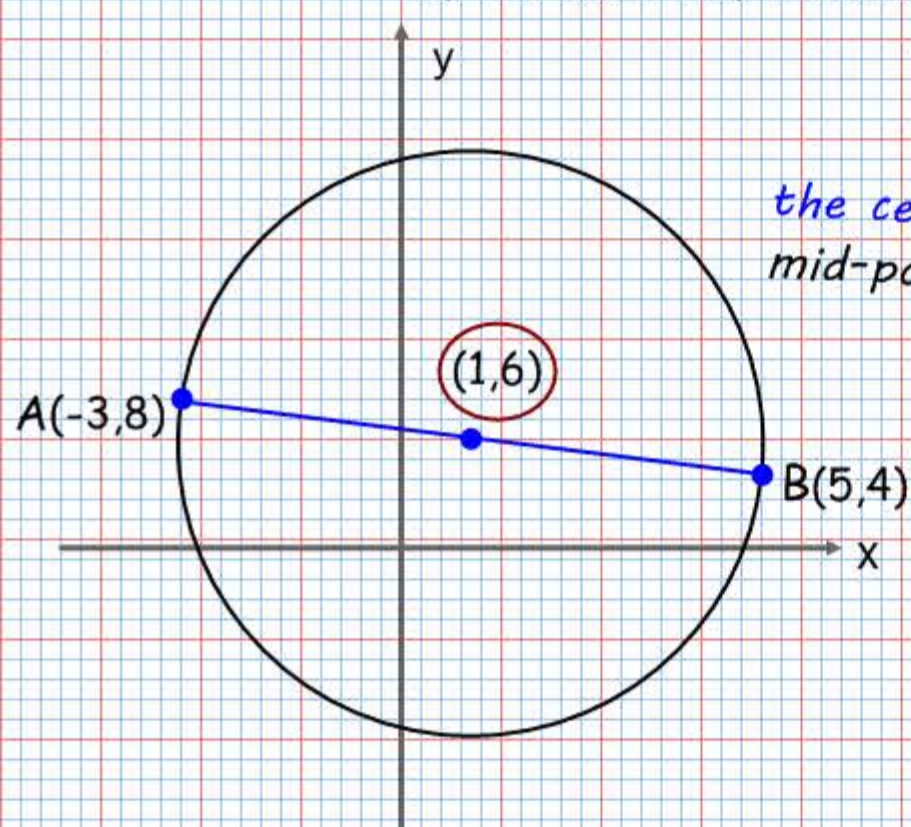
$$(y - y_1) = m(x - x_1)$$

$$m \times -\frac{1}{m} = -1$$

Exercises

①

The line AB is a diameter of a circle, where A and B are $(-3,8)$ and $(5,4)$ respectively. Find the coordinates of the centre of the circle.



$$\left(\frac{x_2 + x_1}{2}, \frac{y_2 + y_1}{2} \right)$$

the centre of the circle is the mid-point of the diameter

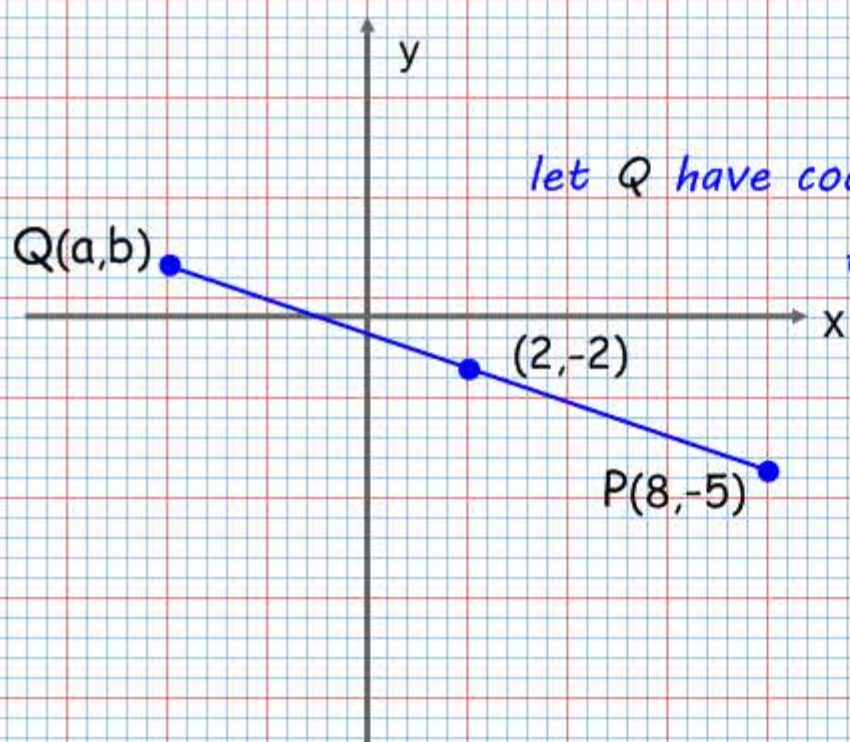
$$x = \frac{-3 + 5}{2} = 1$$

$$y = \frac{8 + 4}{2} = 6$$

$$(x, y) = (1, 6)$$

②

The line PQ is a diameter of the circle centre $(2, -2)$. Given P is $(8, -5)$ find the coordinates of Q.



$$\left(\frac{x_2 + x_1}{2}, \frac{y_2 + y_1}{2} \right)$$

let Q have coordinates (a, b)

$$\text{then } \left(\frac{8 + a}{2}, \frac{-5 + b}{2} \right) = (2, -2)$$

$$\frac{8 + a}{2} = 2$$

$$\frac{-5 + b}{2} = -2$$

③

The line AB is a diameter of a circle centre C, where A and B are $(-1, 4)$ and $(5, 2)$ respectively. The line l passes through C and is perpendicular to AB. Find the equation of l .

$$\left(\frac{x_2 + x_1}{2}, \frac{y_2 + y_1}{2} \right)$$

$$\frac{-1 + 5}{2} = 2$$

$$\frac{4 + 2}{2} = 3$$

$$C = (2, 3)$$

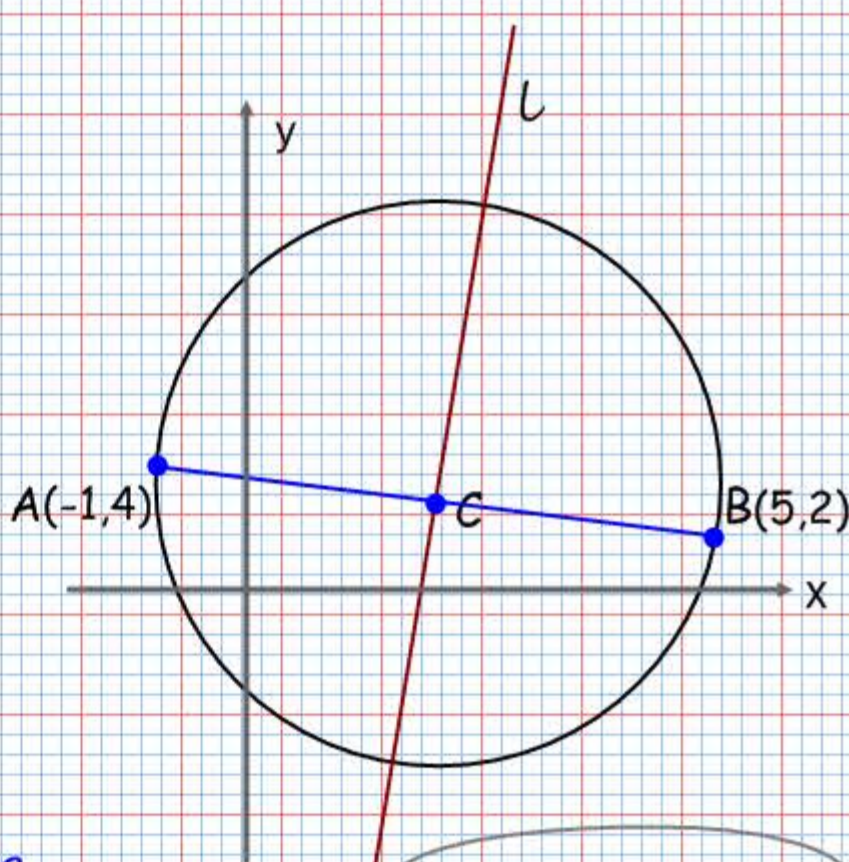
$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

the gradient of AB

$$m = \frac{4 - 2}{-1 - 5} = \frac{2}{-6} = -\frac{1}{3}$$

$$m \times -\frac{1}{m} = -1$$

the gradient of $l = 3$



$$(y - y_1) = m(x - x_1)$$

$$(x_1, y_1) = C = (2, 3)$$

$$m = 3$$

$$(y - 3) = 3(x - 2)$$

the equation of l

$$y = 3x - 3$$