Lesson 8

8.1 Diameter

In general, two points will fix the location of any straight line and three points the location of any circle, provided the three points are not collinear.

What does collinear mean ?

☞

[1 mark]

However, two points can fix the location of a circle, if those points are the end points of its diameter.

8.2 Example

The line joining the points $(-3, 4)$ and $(5, 19)$ is the diameter of the circle C. Find an equation for C.

[6 marks]

8.3 Solution to 8.2 Example

[6 marks]

8.4 Exercise

*Any solution based entirely on graphical
or numerical methods is not acceptable*

Marks Available : 61

Question 1

A-Level Examination Question from January 2005, Paper C2, Q2 (Edexcel)

The points A and B have coordinates $(5, -1)$ and $(13, 11)$ respectively

(a) Find the coordinates of the mid-point of AB

[2 marks]

Given that AB is a diameter of the circle C

(b) find an equation for C

[4 marks]

Question 2

A-Level Examination Question from January 2007, Paper C2, Q3 (Edexcel)

The line joining the points $(-1, 4)$ and $(3, 6)$ is a diameter of the circle C

Find an equation for C

[6 marks]

Question 3

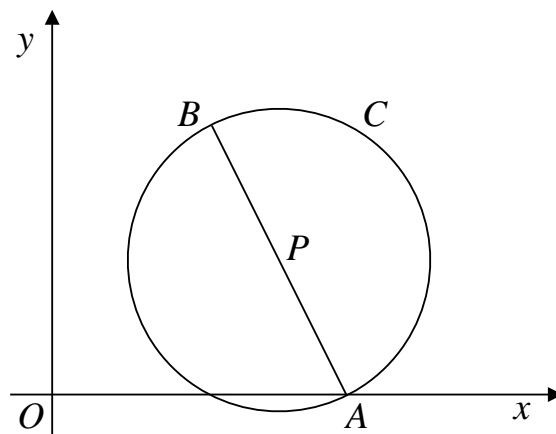*A-Level Examination Question from January 2012, Paper C2, Q2 (Edexcel)*

A circle C has centre $(-1, 7)$ and passes through the point $(0, 0)$

Find an equation for C

[**4 marks**]

Question 4

A-Level Examination Question from January 2006, Paper C2, Q3 (Edexcel)

The end points of a diameter of the circle C are $A(4, 0)$ and $B(3, 5)$

Find

(**a**)   the exact length of AB

[**2 marks**]

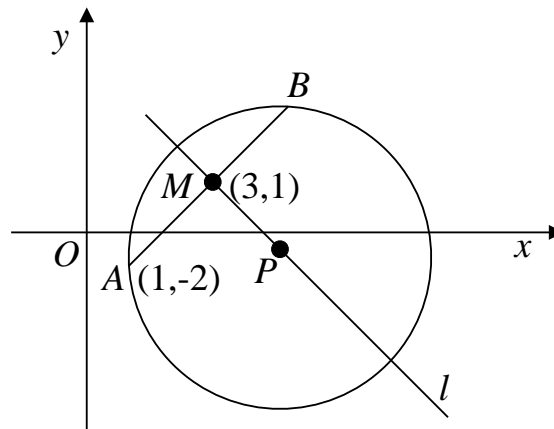(**b**)   the coordinates of the midpoint P of AB

[**2 marks**]

(**c**)   an equation for the circle C

[**3 marks**]

Question 5
A-Level Examination Question from May 2007, Paper C2, Q7 (Edexcel)

The points *A* and *B* lie on a circle with centre *P*, as shown.
The point *A* has coordinates (1, − 2)
The mid-point *M* of *AB* has coordinates (3, 1)
The line *l* passes through the points *M* and *P*
(**a**)　　Find an equation for *l*

[4 marks]

Given that the *x*-coordinate of *P* is 6,
(**b**)　　use your answer to part (a) to show that the *y*-coordinate of *P* is − 1,

[1 mark]

(**c**)　　find an equation for the circle.

[4 marks]

Question 6

A-Level Examination Question from May 2018, Paper C12, Q13 (Edexcel)

The point A ($9, -13$) lies on a circle C with centre the origin and radius r

(a)   Find the exact value of r

[**2 marks**]

(b)   Find an equation of the circle C

[**1 mark**]

A straight line through point A has equation $2y + 3x = k$, where k is a constant

(c)   Find the value of k

[**1 mark**]

This straight line cuts the circle again at the point B

(d)   Find the exact coordinates of point B

[**6 marks**]

Question 7

The circle *C* has equation,

$$x^2 + y^2 - 6x + 4y = 12$$

(**a**)   Find the centre and the radius of *C*

[**5 marks**]

The point *P* (− 1, 1) and the point *Q* (7, − 5) both lie on *C*

(**b**)   Show that *PQ* is a diameter of *C*
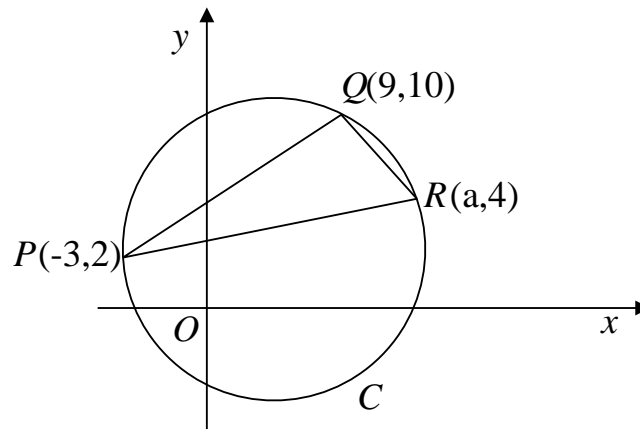
[**2 marks**]

The point *R* lies on the positive *y*-axis and the angle *PRQ* = 90°

(**c**)   Find the coordinates of *R*

[**4 marks**]

Question 8

A-Level Examination Question from January 2009, Paper C2, Q5 (Edexcel)

The points $P(-3, 2)$, $Q(9, 10)$ and $R(a, 4)$ lie on the circle C, as shown. Given that PR is a diameter of C,

(**a**)   show that $a = 13$,

[3 marks]

(**b**)   find an equation for C.

[5 marks]