



AQA Qualifications

---

# AQA Level 2 Certificate

## FURTHER MATHEMATICS

Level 2 (8365)

---

### Worksheet 1

Coordinate Geometry Circles

---

Our specification is published on our website ([www.aqa.org.uk](http://www.aqa.org.uk)). We will let centres know in writing about any changes to the specification. We will also publish changes on our website. The definitive version of our specification will always be the one on our website, this may differ from printed versions.

You can download this resource from our All About Maths website (<http://allaboutmaths.aqa.org.uk/>).

Copyright © 2018 AQA and its licensors. All rights reserved.

AQA retains the copyright on all its publications, including the specifications. However, registered centres for AQA are permitted to copy material from this specification booklet for their own internal use.

AQA Education (AQA) is a registered charity (number 1073334) and a company limited by guarantee registered in England and Wales (number 3644723). Our registered address is AQA, Devas Street, Manchester M15 6EX.

# 1 Coordinate Geometry - Circles

## Question 1

Write down the equation of each of these circles.

**(a)** Centre (0, 3) radius 2 (2 marks)

**(b)** Centre (1, -5) radius 4 (2 marks)

**(c)** Centre (-3, 4) radius  $\sqrt{7}$  (2 marks)

**(d)** Centre (8, 15) radius 17  
Does this circle pass through the origin?  
Show working to support your answer. (4 marks)

## Question 2

Write down the centre and radius of each of these circles.

**(a)**  $x^2 + y^2 = 36$  (2 marks)

**(b)**  $(x - 3)^2 + (y - 4)^2 = 100$  (2 marks)

**(c)**  $(x + 5)^2 + y^2 = 3$  (2 marks)

## Question 3 (non-calculator)

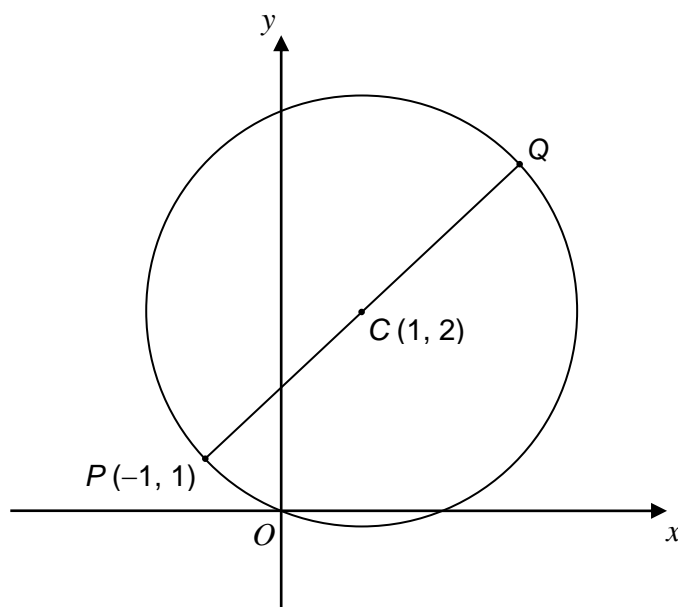
$AB$  is the diameter of a circle.

$A$  is (-3, 6) and  $B$  is (5, 12).

Work out the equation of the circle. (5 marks)

Question 4 (non-calculator)

$PQ$  is a diameter of a circle, centre  $C$ .

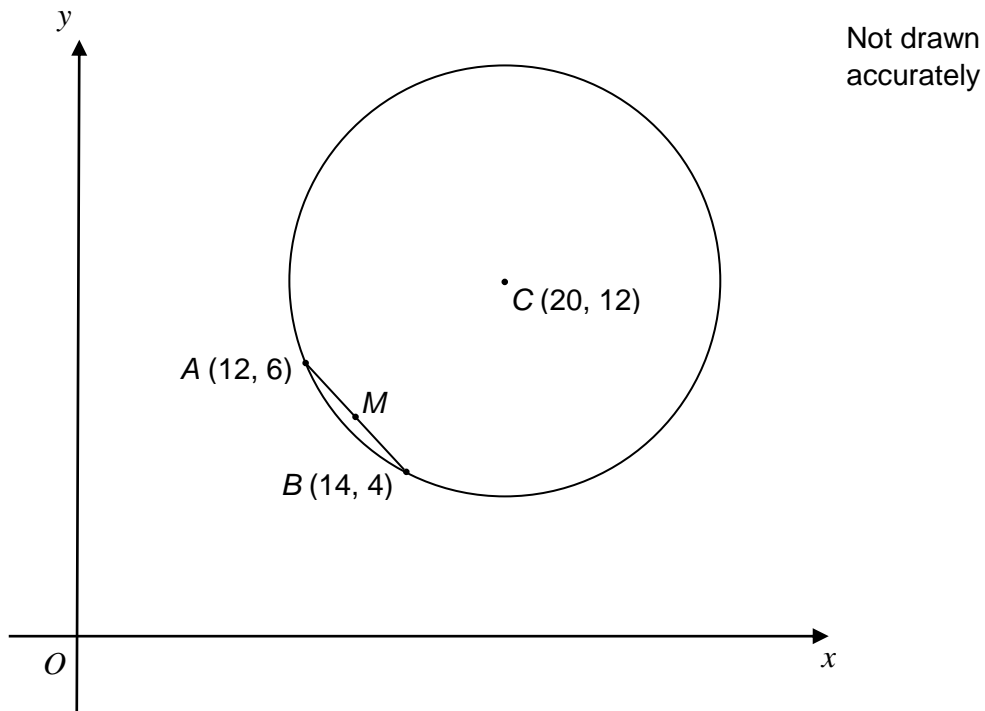


Not drawn  
accurately

- (a) Work out the coordinates of  $Q$ . (1 mark)
- (b) Work out the equation of the circle. (3 marks)

## Question 5 (non-calculator)

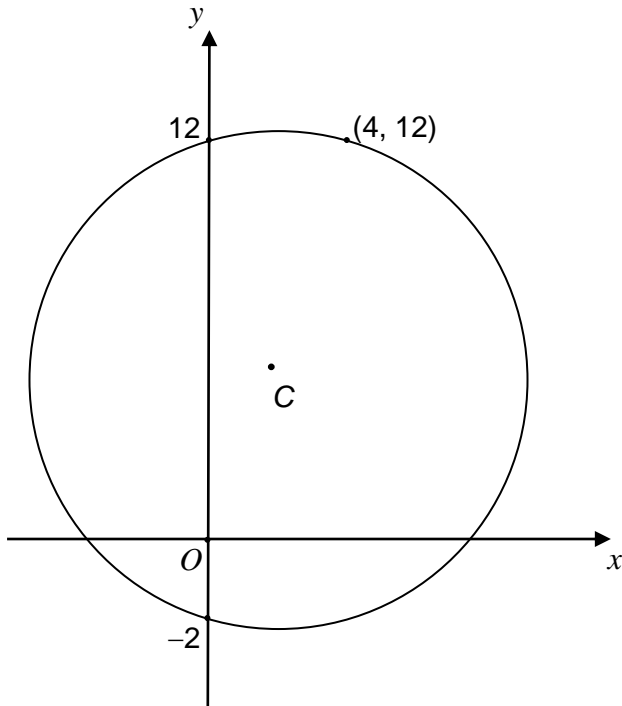
$A(12, 6)$  and  $B(14, 4)$  are two points on a circle, centre  $C(20, 12)$ .



- (a) Work out the coordinates of the midpoint  $M$ , of  $AB$ . (2 marks)
- (b) Show that the length  $CM = 7\sqrt{2}$  (3 marks)
- (c) Work out the radius of the circle. (2 marks)

## Question 6

$(0, -2)$ ,  $(0, 12)$  and  $(4, 12)$  are three points on a circle, centre  $C$ .



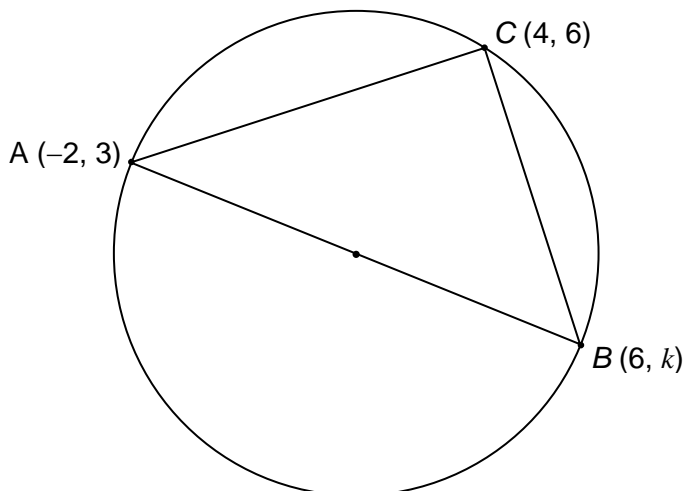
Not drawn accurately

Work out the coordinates of  $C$ .

(3 marks)

## Question 7

$AB$  is a diameter of the circle  $ABC$ .



Not drawn accurately

Work out the value of  $k$ .

(5 marks)

## Question 8

A circle has equation  $(x - 5)^2 + (y - 4)^2 = 100$

Show that the point  $(13, -2)$  lies on the circle.

(2 marks)

## Question 9

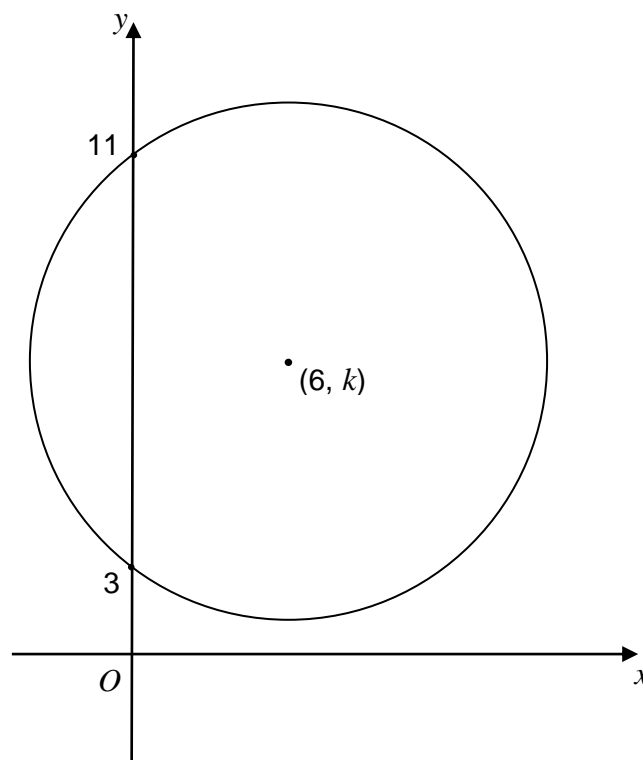
The point  $(13, -2)$  lies on the circle  $(x - a)^2 + (y - 4)^2 = 100$

Work out the two possible values of  $a$ .

(5 marks)

## Question 10

A circle passes through the points  $(0, 3)$  and  $(0, 11)$  and has centre  $(6, k)$



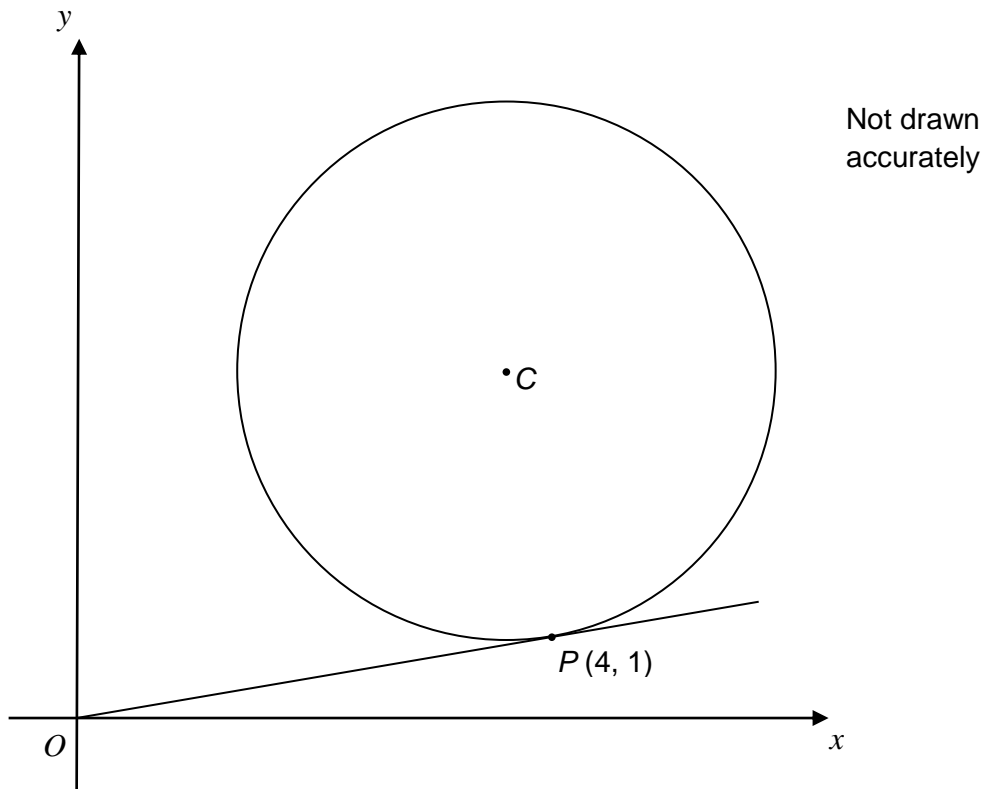
- (a) Work out the value of  $k$ .
- (b) Hence find the equation of the circle.

(5 marks)

Question 11 (non-calculator)

The equation of this circle, centre  $C$ , is  $(x - 3)^2 + (y - 5)^2 = 17$

$P(4, 1)$  is a point on the circle.



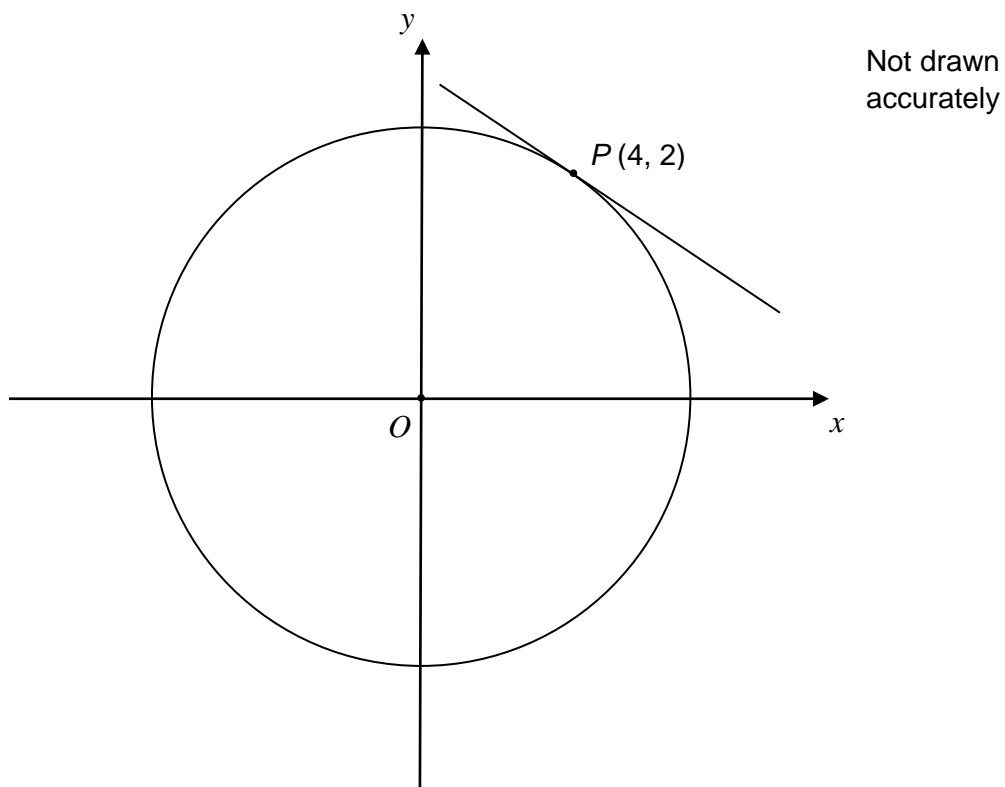
- (a) Show working to explain why  $OP$  is a tangent to the circle. (5 marks)
- (b) Show that the length  $OP$  is equal to the radius of the circle. (3 marks)



## Question 12 (non-calculator)

The equation of this circle is  $x^2 + y^2 = 20$

$P(4, 2)$  is a point on the circle.



Work out the equation of the tangent to the circle at  $P$ .

Give your answer in the form  $y = mx + c$

(3 marks)

## Question 13

$A(-2, 5)$  and  $B(4, 13)$  are points on a circle.

$AB$  is a diameter.

- (a) Work out the equation of the circle.

(4 marks)

- (b) Work out the equation of the tangent to the circle passing through  $A$ .

Give your answer in the form  $ax + by + c = 0$

(4 marks)