FluidMaths

GCSE Mathematics (Grade 9-1)

Problem Solving
Equation of a Circle

The marks shown are for guidance purposes only

When not specified, round all non-terminating decimals during your calculations to 3 significant figures

Some useful strategies in problem-solving

- Read the question carefully
- Sketch a diagram where applicable
- Take note of key information
- Write down any formulae you may need
- Tackle the problem in bite-size rather than as a whole
- Concentrate on the part of the problem you understand and start from there
- Collaborate with a partner and share ideas
- Use a dictionary to find the meaning of any confusing words
- Check that your answers make sense in the context of the question

1 The area of a circle is given as $48k\pi$ cm^2
Where k is a positive whole number.
The centre of the circle is $(0, 0)$
Find the equation of the circle in terms of k.

[2marks]

2 The equation of a circle is $x^2 + y^2 = 16a$
Given that the circumference of the circle is 18π cm,
calculate the exact value of a.

[3marks]

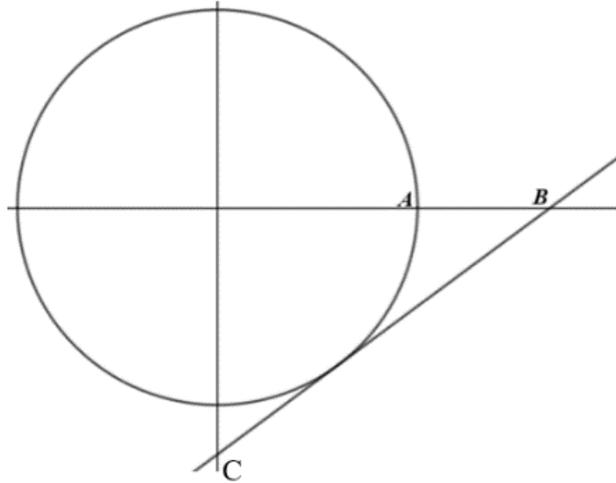**3** ABCD is a kite of area 24 cm^2.
The kite is drawn inside a circle with equation $x^2 + y^2 = 16$
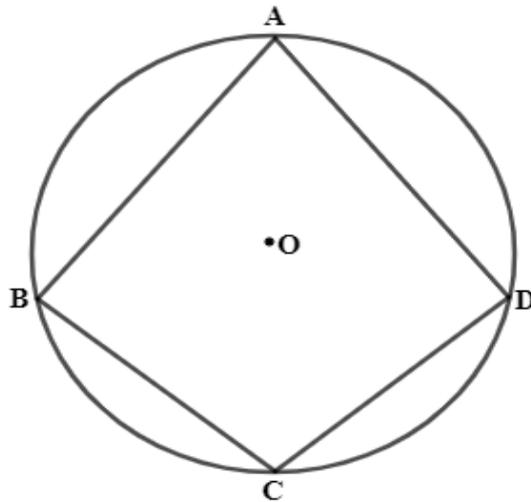
Show that the ratio AC: BD = 4:3

[4marks]

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4 A circle with centre at $(0, 0)$ is shown below

The equation of the circle is $x^2 + y^2 = 16$
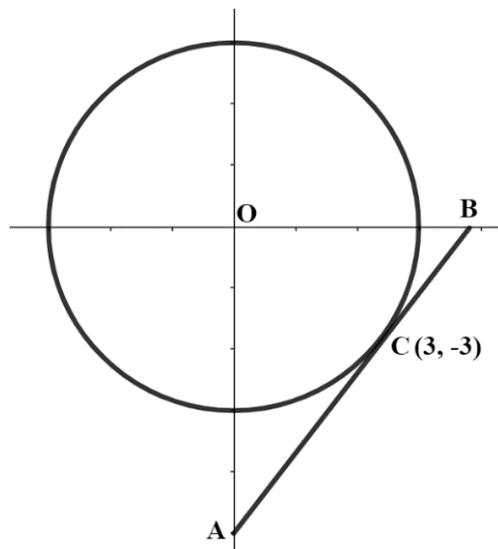
The circle intersects the x-axis at point A

The line BC is a tangent with the equation $y = \frac{3}{4}x - 5$

How far is B from A?

Give your answer to 1 decimal place.

[3marks]

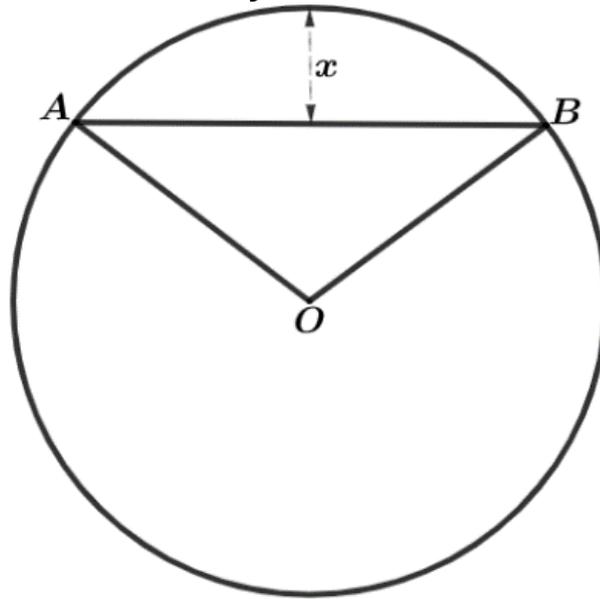**5** The diagram shows a circle with centre O

The line AB is a tangent to the circle at C $(3, -3)$

Calculate the distance AO.

[3marks]

6 A circle with equation $x^2 + y^2 - 75 = 0$ is shown below

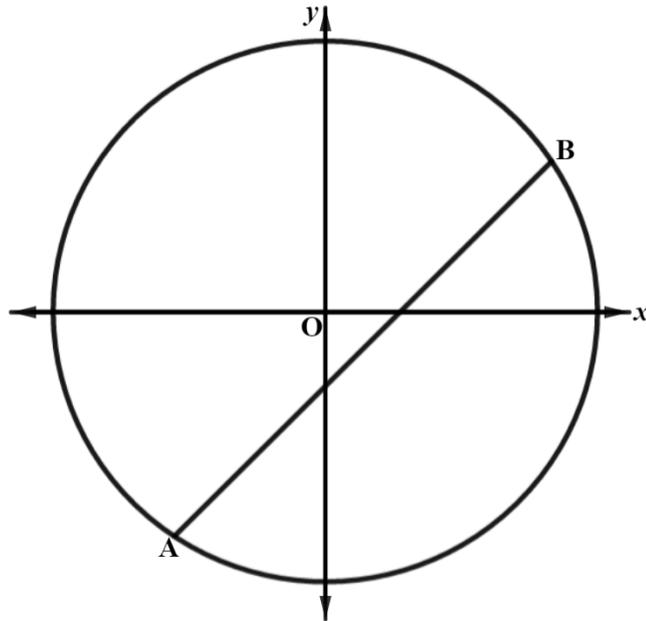$AB = 8\sqrt{3}$ cm

Show that $x = 2\sqrt{3}$

[5marks]

7 The equation of a circle is given as $x^2 + y^2 = 32$

The equation of a tangent to the circle is $y = ax + b$

The tangent touches the circle at point P

The coordinates of P are $(p, -5p)$

    a)   Show that $a = \dfrac{1}{5}$ **[2marks]**

    b)   Show that $b = -\dfrac{26}{5}p$ **[3marks]**

    c)   Given that $b = -\dfrac{39}{5}$, find the value of p **[2marks]**

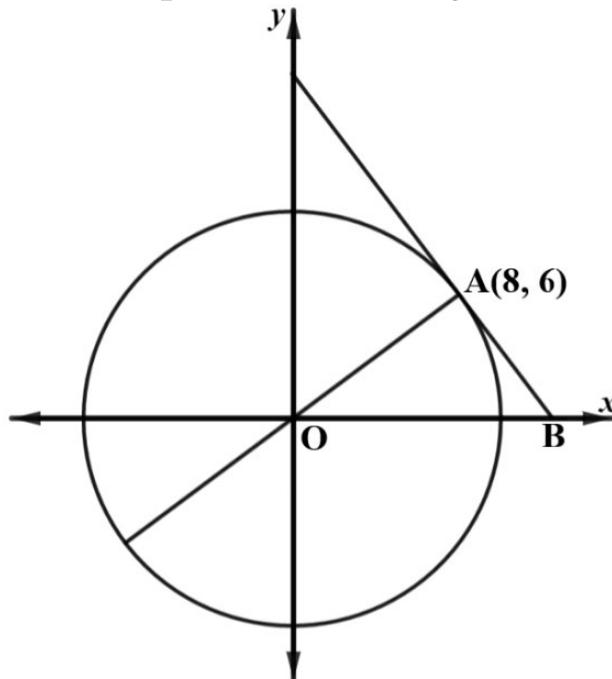**8** Here is a circle with equation $x^2 + y^2 = 52$

AB is a chord with equation $y = x - 2$

Find the length of line AB.

Give your answer in the form $m\sqrt{n}$.   **[6marks]**

9 Here is a circle with equation $x^2 + y^2 = 100$

A tangent touches the circle at point A (8, 6)

B is the point where the tangent intersects the x-axis

Find the length of AB

[6marks]