

1 Equation of a circle

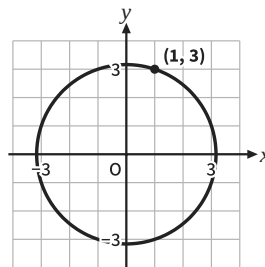
- a) A circle with centre $(0, 0)$ passes through $(-5, 12)$.
Write down its equation.
- b) Find the diameter of the circle $x^2 + y^2 = 72$.
Give your answer as a surd in its simplest form.

a) $25 + 144 = 169: x^2 + y^2 = 169$
b) radius $\sqrt{72} = \sqrt{36 \times 2} = 6\sqrt{2}$
diameter $= 12\sqrt{2}$

2 Equation of a circle

The circle has centre $(0, 0)$ and passes through $(1, 3)$.

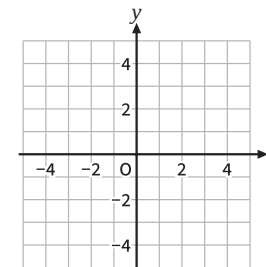
- a) Write down the equation of the circle.
- b) Find the exact coordinates of the four points where it crosses the axes.



a) $1 + 9 = 10: x^2 + y^2 = 10$
b) $(\pm\sqrt{10}, 0)$ and $(0, \pm\sqrt{10})$

3 Equation of a circle

- a) On the grid, draw the circle $x^2 + y^2 = 16$.
- b) Draw the line $y = -2.5$.
Estimate the x coordinates of the points where it meets the circle.



a) centre $(0, 0)$, radius 4
b) $x = 3.1$ or -3.1 (± 0.1)

4 Equation of a circle

The point $(p, 2p)$ lies on the circle $x^2 + y^2 = 45$.

- a) Find the two possible values of p .
- b) Find the coordinates of the points where the circle meets the line $y = 3$.

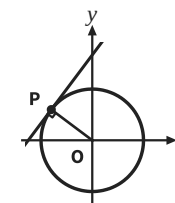
a) $p^2 + 4p^2 = 45, p^2 = 9$
 $p = 3$ or $p = -3$
b) $x^2 = 36: (6, 3)$ and $(-6, 3)$

Equations of circles revision mat answers

5 Equation of a tangent

$P(-4, 3)$ is on the circle $x^2 + y^2 = 25$.

- a) Find the equation of the tangent to the circle at P .
- b) Where does the tangent meet the y axis?



a) gradient $\frac{4}{3}: y = \frac{4}{3}x + \frac{25}{3}$
b) $(0, \frac{25}{3})$

6 Equation of a tangent

The point P on the circle $x^2 + y^2 = 40$ has x coordinate 2 and is below the x axis.

- a) Find the coordinates of P .
- b) Find the gradient of the tangent to the circle at P .

a) $4 + y^2 = 40, y = -6: P(2, -6)$
b) OP gradient -3 , so the tangent is $\frac{1}{3}$

7 Equation of a tangent

Mia says the tangent to $x^2 + y^2 = 13$ at $(2, 3)$ is $y = \frac{2}{3}x + \frac{5}{3}$.

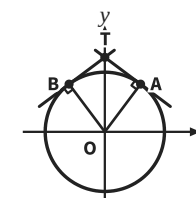
- a) Explain Mia's mistake.
- b) Find the correct equation of the tangent.

a) she flipped $\frac{3}{2}$ but did not change the sign
b) gradient $-\frac{2}{3}: y = -\frac{2}{3}x + \frac{13}{3}$

8 Equation of a tangent

The tangents to $x^2 + y^2 = 25$ at $A(3, 4)$ and $B(-3, 4)$ meet at T .

- a) Find the equation of the tangent at A .
- b) Find the coordinates of T .



a) gradient $-\frac{3}{4}: y = -\frac{3}{4}x + \frac{25}{4}$
b) by symmetry, $T(0, \frac{25}{4})$