Higher

Mathematics

Circles

Examples

Contents

1 Representing a Circle A

1. Find the equation of the circle with centre $(1, -3)$ and radius $\sqrt{3}$ units.

1 Representing a Circle A

2. A is the point $(-3,1)$ and $B(5,3)$.

   Find the equation of the circle which has AB as a diameter.

2 Testing a Point A

A circle has the equation $(x-2)^2+(y+5)^2=29$.

Determine whether the points $(2,1)$, $(7,-3)$ and $(3,-4)$ lie within, outwith or on the circumference of the circle.

3 The General Equation of a Circle A

1. Find the radius and centre of the circle with equation $x^2 + y^2 + 4x - 8y + 7 = 0$.

3 The General Equation of a Circle A

2. Find the radius and centre of the circle with equation
$2x^2 + 2y^2 - 6x + 10y - 2 = 0$.

3 The General Equation of a Circle A

3. Explain why $x^2 + y^2 + 4x - 8y + 29 = 0$ is not the equation of a circle.

3 The General Equation of a Circle A

4. For which values of k does $x^2 + y^2 - 2kx - 4y + k^2 + k - 4 = 0$ represent a circle?

4 Intersection of a Line and a Circle A

1. Find the points where the line with equation $y = 3x$ intersects the circle with equation $x^2 + y^2 = 20$.

4 Intersection of a Line and a Circle A

2. Find the points where the line with equation $y = 2x + 6$ and circle with equation $x^2 + y^2 + 2x + 2y - 8 = 0$ intersect.

5 Tangents to Circles A

Show that the line with equation $x + y = 4$ is a tangent to the circle with equation $x^2 + y^2 + 6x + 2y - 22 = 0$.

6 Equations of Tangents to Circles A

Show that $A(1, 3)$ lies on the circle $x^2 + y^2 + 6x + 2y - 22 = 0$ and find the equation of the tangent at A.

7 Intersection of Circles A

1. Circle P has centre $(-4, -1)$ and radius 2 units, circle Q has equation $x^2 + y^2 - 2x + 6y + 1 = 0$. Show that the circles P and Q do not touch.

7 Intersection of Circles

A

2. Circle R has equation $x^2 + y^2 - 2x - 4y - 4 = 0$, and circle S has equation $(x-4)^2 + (y-6)^2 = 4$. Show that the circles R and S touch externally.