Equation of a circle



Examples:

1.

|  |  |  |
| --- | --- | --- |
| Centre | Radius | Equation |
| $$(0,0)$$ | $$5$$ |  |
| $$(1,2)$$ | $$6$$ |  |
|  |  | $$\left(x+3\right)^{2}+\left(y-5\right)^{2}=1$$ |
|  |  | $$\left(x+5\right)^{2}+\left(y-2\right)^{2}=49$$ |
|  |  | $$\left(x+6\right)^{2}+y^{2}=16$$ |
|  |  | $$\left(x-1\right)^{2}+\left(y+1\right)^{2}=3$$ |
|  |  | $$\left(x+2\right)^{2}+\left(y-3\right)^{2}=8$$ |

2. A line segment $AB$ is the diameter of a circle, where $A$ and $B$ have coordinates $\left(5,8\right)$ and $\left(-7,4\right)$ respectively. Determine the equation of the circle.

Test your understanding



Completing the Square

Example

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

Test your understanding



Extension:

1. [MAT 2009 1B] The point on the circle $x^{2}+y^{2}+6x+8y=75$ which is closest to the origin, is at what distance from the origin?

2. [MAT 2007 1D]

The point on the circle $\left(x-5\right)^{2}+\left(y-4\right)^{2}=4$ which is closest to the circle

$\left(x-1\right)^{2}+\left(y-1\right)^{2}=1$ has what coordinates?

3. [MAT 2016 1I] Let $a$ and $b$ be positive real numbers. If $x^{2}+y^{2}\leq 1$ then the largest that $ax+by$ can equal is what?

Give your expression in terms of $a$ and $b$.

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