Conics, loci and parametric descriptions

Learn and practise | Free preview

A sample from this topic. The complete topic collection contains three different resources and worked solutions.

Read the worked example, then show each step in the practice questions. Show the mathematical steps. A calculator, graphing tool or CAS may be used to check results where useful.

What you will practise

• Loci, Cartesian, parametric and polar forms; absolute value

Useful starting skills: Year 10 and relevant Year 10A algebra, functions and trigonometry; concurrent Methods supports these topics.

A locus describes points satisfying a geometric condition. Circles, parabolas, ellipses and hyperbolas have recognisable Cartesian equations and useful parametric forms.

Parametric equations give x and y using another variable; polar coordinates use $x=r\cos\theta$, $y=r\sin\theta$. Eliminate a parameter carefully and retain any domain restriction.

Worked example

Eliminate t from $x=2\cos t$, $y=3\sin t$.

Divide and square both coordinates, then use $\cos^2 t+\sin^2 t=1$.

Answer: $x^2/4+y^2/9=1$.

Try it yourself

Name: _____ Date: _____

1. Give centre and radius of $(x-2)^2+(y+1)^2=16$.

2. For $y^2=8x$, find focus and directrix.

Answers and explanations

Check the method as well as the final answer. An alternative correct method is also valid.

1. (2, -1), radius 4.

Compare with standard circle form.

2. Focus (2, 0), directrix x=-2.

Use $y^2=4px$ with p=2.

Curriculum reference: Specialist Mathematics Units 1–2 — Loci, Cartesian, parametric and polar forms; absolute value

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