Non linear simultaneous equations

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

Read the explanation and worked example. Show your working; use a calculator only where asked.

What you will practise

• Find intersections of linear and non-linear relations.

• Explain a method and check the reasonableness of a result.

Useful starting skills: Use the prerequisite operations and representations shown in the worked example.

Substitute a line into a quadratic or circle equation to reduce the system to one variable. Solve all resulting roots and recover the corresponding other coordinates.

Graphical and numerical methods can locate intersections when algebra is difficult. Check the entire relevant domain and substitute each candidate into both original equations.

Worked example

Solve $y=x+2$ and $y=x^2$.

$x^2=x+2$ gives $(x-2)(x+1)=0$.

Find y for $x=2$ and $x=-1$.

Answer: (2,4) and (-1,1)

Try it yourself

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1. Solve $y=x$ and $y=x^2$.

2. Solve $y=2$ and $x^2+y^2=13$.

Answers and explanations

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

1. (0,0), (1,1)

$x^2=x$ gives $x(x-1)=0$.

2. (-3,2), (3,2)

$x^2+4=13$.

Curriculum reference: VC2M10AA09

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