# Numerical and graphical equation solving

## Learn and practise | Free preview

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

• Approximate roots and check whether every solution has been found.

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

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

A graph locates possible roots where it crosses or touches the x-axis. A sign change across an interval can bracket a root of a continuous function, but a touching root need not change sign.

Bisection halves a bracket repeatedly. State an accuracy and inspect the whole relevant domain; one numerical root does not prove uniqueness.

## Worked example

Approximate the positive solution of $x^2=5$.

$2^2<5<3^2$, so root lies in (2,3).

Testing 2.23 and 2.24 brackets it; $\sqrt{5}\approx2.236$.

Answer: About 2.24 to 2 decimal places

## Try it yourself

Name: _____ Date: _____

1. Bracket a root of $x^3-10=0$ between consecutive integers.

2. Use a calculator to solve $x^2=13$ to 2 decimal places.

## Answers and explanations

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

1. 2 and 3

8-10<0; 27-10>0.

2. $x \approx \pm 3.61$

Remember both square roots.

Curriculum reference: VC2M10A16

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