VCE Mathematical Methods Unit 1

Unit 1 Areas of Study 1 and 2: Functions, relations and graphs, and Algebra, number and structure

Example of learning activity: Bisection for a cubic

Introduction

This learning activity applies the bisection method for finding an approximate solution to an irrational root of a cubic polynomial function.



Part 1

1. Use the rational root theorem to show that the function *f* has no rational roots.
2. Plot the graph of *f* and use a table of values to identify the unit interval with integer endpoint that contains the real root of *f.*
3. Vary the graphing domain and use a systematic guess-check-refine approach to find an approximate value for the root correct to one decimal place.
4. Complete a tale of values for the first four iterations of the bisection process.
5. Use a short program or technology application to apply the bisection process and determine the number of iterations required to obtain an approximate value correct to one decimal place, three decimal places and five decimal places.

Part 2

Repeat this analysis for a selection of other cubic polynomial functions.

Areas of study

The following content from the areas of study is addressed through this task.

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| **Unit 1** |
| **Area of study** | **Content dot point** |
| Functions, relations and graphs | 2 |
| Algebra, number and structure | 7 |
| Calculus | – |
| Data analysis, probability and statistics  | – |

Outcomes

The following outcomes, key knowledge and key skills are addressed through this task.

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| **Unit 1** |
| **Outcome** | **Key knowledge dot point(s)** | **Key skills dot point(s)** |
| 1 | 2 | 7 |
| 2 | 1, 2, 3 | 3, 5 |
| 3 | 2, 3 | 3, 6, 7, 9 |