VCE Mathematical Methods Unit 1

Unit 1 Area of Study 1: Functions, relations and graphs

Example of learning activity: Exploring the graphs of power functions

Introduction

This learning activity explores power functions of the form by

* Using the graphing functionality of technology to explore power functions for varying values of .
* After observing the patterns and characteristics for the varying sets of values for , students should generalise and summarise their findings.

Part 1

Using technology, have students explore the graph of for the following sets of values   
of . Have students sketch, without technology, the~~ir~~ expected shape of the graphs for each set of before verifying the correct form using their technology.

1. Consider by setting up a slider from in steps of 2.

Describe how the graph changes as changes, including when .

Explain how these changes relate to the rule of the function.

1. Consider by setting up a slider from in steps of 2.

Describe how this set of graphs differs to the one in a. and why.

Explain why the graph for looks different from the other graphs.

1. Consider by setting up a slider from in steps of 2.

Describe how this set of graphs differs to the one in a. and why.

1. Consider by setting up a slider from in steps of 2.

Describe how this set of graphs differs to the one in b. and why.

Part 2

Summarise findings from a. to d. above and include a sketch of the generalised shape for each set of values of , noting key characteristics and exceptions.

Part 3

Continue the explorations of the graph of for fractional values of . Have students sketch their expected shape of the graphs for each set of before verifying the correct form using their technology.

1. Let where with a slider from 1 in steps of 1.

Describe how the general shape of the graph differs when is odd or even.

Explain how these changes relate to the rule of the function and why there is no graph for .

1. Let where with a slider from in steps of 1.

Describe how the general shape of the graph differs when is odd or even.

Part 4

Extend the summary to include findings from Part 3.

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 | 3 |
| Algebra, number and structure | – |
| Calculus | – |
| Data analysis, probability and statistics | – |

Outcomes

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

|  |  |  |
| --- | --- | --- |
| **Unit 1** | | |
| **Outcome** | **Key knowledge dot point(s)** | **Key skills dot points** |
| 1 | 2 | 1, 12 |
| 2 | 2, 4, 5 | 5, 6 |
| 3 | 3, 5, 8 | 3, 4, 7 |