VCE Mathematical Methods Unit 2

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

Example of learning activity: Estimating radians, sine and cosine on a unit circle

Introduction

This learning activity is a quick visual activity based on estimating the location of points corresponding to radian measure on the circumference of a unit circle, and the (signed) length of line segments corresponding to sine and cosine. It also looks at finding rough visual estimates for solutions to equations of the form  or in the interval .



Part 1

1. Draw a unit circle using a scale of 10 cm = 1 unit.
Use the values to place points corresponding approximately to
1, 2, 3, 4, 5 and 6 radians on the circumference of the circle.

Use the appropriate vertical and horizontal line segments to find approximations for the corresponding values of sine and cosine.

1. Use the values  to approximately locate points on the circumference of the unit circle corresponding to 0.6, 2.3, 4.6 and 5.1 radians. Estimate the corresponding values for sine and cosine in each case.
2. Use technology to check these estimates.

Part 2

1. Draw a unit circle using a scale of 10 cm = 1 unit.
2. Draw in the horizontal line $y=0.3$ and use this to estimate the solutions to $\sin(\left(x\right))=0.3$ over the interval. Repeat this for various other horizontal lines$y=k$ where $-1<k<1.$.
3. Draw in the vertical line $x=-0.8$ and use this to estimate the solutions to $\cos(\left(x\right))=-0.8$ over the interval. Repeat this for various other vertical lines $x=k$ where .$-1<k<1.$
4. Use technology to check these estimates.

Areas of study

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

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| **Unit 2** |
| **Area of study** | **Content dot point(s)** |
| Functions, relations and graphs | 1, 2, 4 |
| Algebra, number and structure | 1 |
| 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 2** |
| **Outcome** | **Key knowledge dot point(s)** | **Key skills dot point(s)** |
| 1 | 2, 3 | 4 |
| 2 | 2 | 2 |
| 3 | 2, 5 | 2, 3 |