Matrix transformations of the plane

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

Read the worked example, then show each step in the practice questions. Show the mathematical steps. A calculator, graphing tool or CAS may be used to check results where useful.

What you will practise

- Transformations

Useful starting skills: Year 10 and relevant Year 10A algebra, functions and trigonometry; concurrent Methods supports these topics.

A linear transformation maps a column vector using a 2×2 matrix; translations add a vector. Apply compositions from right to left in matrix products.

The absolute determinant gives area scale. Rotations and reflections preserve lengths; general linear transformations need not. Inverse transformations undo the mapping when the matrix is invertible.

Worked example

Rotate (2, 1) anticlockwise 90° about the origin.

Multiply by [[0, -1], [1, 0]].

Answer: (-1, 2).

Try it yourself

Name: _____ Date: _____

1. Reflect (3, -2) in the x-axis.

2. Apply [[2, 0], [0, 3]] to (1, 4).

Answers and explanations

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

1. (3, 2).

Use [[1, 0], [0, -1]].

2. (2, 12).

Scale the x and y components separately.

Curriculum reference: Specialist Mathematics Units 1–2 — Transformations

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