Matrices, communication and dominance

Learn and practise | Free preview

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

• Matrices and their applications

Useful starting skills: Relevant General Mathematics Units 1–2 arithmetic, algebra, statistics, matrices and networks.

Matrix products can count two-step connections or combine tabular data. Define whether rows or columns describe origin before interpreting entries.

A communication matrix records direct links. Its square counts directed two-step walks, not necessarily distinct intermediaries reachable without repeating an edge.

Worked example

A=[[0, 1, 1], [0, 0, 1], [1, 0, 0]]. Find $(A^2)_{1, 3}$.

Row 1 dot column 3=0×1+1×1+1×0=1

there is one two-step walk 1→2→3.

Answer: 1.

Try it yourself

Name: _____ Date: _____

1. Transpose [[1, 2, 3], [4, 5, 6]].

2. For $a_{ij}=i+2j$, construct the 2×2 matrix, with indices starting 1.

Answers and explanations

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

1. [[1, 4], [2, 5], [3, 6]].

Rows become columns.

2. [[3, 5], [4, 6]].

Substitute each row and column index.

Curriculum reference: General Mathematics Units 3–4 — Matrices and their applications

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