Assignment and critical-path scheduling

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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

• Matching problems

• Scheduling problems and critical path analysis

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

Assignment problems match each person or machine to one task while minimising cost or maximising benefit. Check all constraints, not just the cheapest individual entries.

A project network records precedence. Forward passes find earliest times; backward passes find latest times. Zero-float activities lie on critical paths; reducing a non-critical duration may not shorten the project.

Worked example

Cost matrix for workers A, B on tasks 1, 2 is [[4, 7], [6, 3]]. Find minimum assignment.

The other assignment costs 7+6=13

choose 4+3.

Answer: A→1, B→2, total 7.

Try it yourself

Name: _____ Date: _____

1. Costs[[8, 3], [5, 9]]: find minimum assignment.

2. Activities A(duration 3) and B(duration 5) start together; C(duration 4) waits for both. Find completion time and critical path.

Answers and explanations

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

1. A→2, B→1, total 8.

Compare 3+5 with 8+9.

2. 9; B–C.

C starts at time 5 and ends 9; A has 2 units float.

Curriculum reference: General Mathematics Units 3–4 — Matching problems; General Mathematics Units 3–4 — Scheduling problems and critical path analysis

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