Rectangular tables and dummy rows/columns

6 questions | 15 marks

Equivalent correct methods earn the corresponding marks.

1. Add the correct type and number of dummy entries to a 4-worker/3-job table with free idling. [2 marks]

There is one more worker than required jobs.

The dummy job means one person is idle.

Answer: One dummy job column, all zeros.

2. Solve the displayed four-worker problem and state who is idle. [3 marks]

Costs ($) for four workers and three required jobs. A worker may remain idle at no cost.

Worker	Job 1	Job 2	Job 3
A	4	8	7
B	6	3	8
C	5	7	2
D	9	4	6

The real costs are 4,3 and 2.

The dummy assignment costs 0.

Answer: Cost $9; A→1, B→2, C→3, D idle.

3. Two workers must each do exactly one job, but there are three compulsory jobs. Can a dummy row alone make all three jobs physically complete? [2 marks]

A dummy is a modelling device, not extra labour.

The original capacity restriction makes completion of all jobs infeasible.

Answer: No.

4. Using the penalty table, find the total for A→3, B→1 and job 2 left unfilled. [2 marks]

Costs ($) for two workers and three jobs, with stated unfilled-job penalties.

Resource	Job 1	Job 2	Job 3
A	6	4	8
B	5	7	3
Unfilled-job penalty	10	2	7

A/job 3 costs 8; B/job 1 costs 5; job 2 penalty is 2.

$8+5+2=15.$

Answer: $15.

5. Using the penalty table, compare all six assignments and give the minimum. [4 marks]

Costs ($) for two workers and three jobs, with stated unfilled-job penalties.

Resource	Job 1	Job 2	Job 3
A	6	4	8
B	5	7	3
Unfilled-job penalty	10	2	7

Totals for A/B/dummy job sequences $(1,2,3),(1,3,2),(2,1,3),(2,3,1),(3,1,2),(3,2,1)$ are 20,11,16,17,15,25.

Choose the smallest feasible total and identify the unfilled job.

Answer: Minimum $11: A→1, B→3, leave job 2 unfilled.

6. Four workers cover three jobs. Idle-worker costs are A:$2, B:$1, C:$4 and D:$3. What should the dummy job column contain? [2 marks]

The dummy column represents the actual cost of leaving that particular worker idle.

It is not automatically zero.

Answer: 2,1,4,3 in rows A, B, C, D.