# Assignment cost tables

6 questions | 16 marks

Equivalent correct methods earn the corresponding marks.

**1.** Use the technician table to find the cost of Ali→1, Bea→2 and Chen→3. [2 marks]

Cost ($) of assigning one technician to each job.

| Technician | Job 1 | Job 2 | Job 3 |
|---|---|---|---|
| Ali | 9 | 2 | 7 |
| Bea | 6 | 4 | 3 |
| Chen | 5 | 8 | 1 |

Read 9,4 and 1.

$9 + 4 + 1 = 14$.

**Answer:** $14.

**2.** List all six possible job sequences for Ali, Bea and Chen. [3 marks]

Choose one of three jobs for Ali, then one of the remaining two for Bea.

Chen receives the remaining job.

**Answer:** $(1, 2, 3)$, $(1, 3, 2)$, $(2, 1, 3)$, $(2, 3, 1)$, $(3, 1, 2)$, $(3, 2, 1)$.

**3.** Evaluate all six technician assignments and identify the minimum. [4 marks]

Cost ($) of assigning one technician to each job.

| Technician | Job 1 | Job 2 | Job 3 |
|---|---|---|---|
| Ali | 9 | 2 | 7 |
| Bea | 6 | 4 | 3 |
| Chen | 5 | 8 | 1 |

Use the six sequences from the preceding question.

Add the three original entries for each sequence.

The smallest total is 9.

**Answer:** Totals $14, $20, $9, $10, $21, $16 respectively; minimum $9 with Ali→2, Bea→1, Chen→3.

**4.** A table records the time each driver needs for a separate delivery. Explain one assumption needed before minimising the sum of the times. [2 marks]

The sum and the maximum are different objective functions.

The correct model must match the operational goal.

**Answer:** For example, the objective really is total driver-hours, not the time when the last simultaneous delivery finishes.

**5.** A proposed allocation uses one entry in each column but two entries in one row. Is it feasible for a standard one-to-one square assignment? [2 marks]

One person would be assigned two jobs.

Another row/person would necessarily be unassigned.

**Answer:** No.

**6.** If every selected cost in a four-person assignment is increased by $3, how much does the total increase, and does this change which complete assignment is cheapest? [3 marks]

Each complete assignment contains four entries.

Every possible total gains the same $4 \times 3 = \$12$.

**Answer:** The total increases by $12; the ranking of complete assignments is unchanged.