Solutions

Award method and answer marks as indicated; accept equivalent correct methods.

2.1

- The variables move oppositely: **negative correlation**.

2.2

- **Each point is a separate paired observation**; connecting them suggests a sequence the data may not have.

2.3

- $y = 2(7) + 10 = \mathbf{24}$, a line-based estimate.

2.4

- $x = 5$ is within the data; $x = 20$ extrapolates and the trend may change.

3.1

(a)

- **Five correctly plotted crosses; positive correlation**.

(b)

- A reasonable line is $y = 3x + 9$, so $y = 19.5$. Accept **about 19 to 21** from a sensible balanced line.

(c)

- **Another variable may affect both quantities; the diagram shows association only**.

3.2

(a)

- Substitute $T = 22$: $s = 4(22) - 20 = \mathbf{68}$.
- For 60 sales, $60 = 4T - 20$, so $T = \mathbf{20}$°C.

(b)

- The line predicts $s = 4(35) - 20 = \mathbf{120}$, but 35°C is outside the observed range, so this is extrapolation.
- A relationship can change outside that range.
- Correlation does not prove causation; other factors, such as visitor numbers, may affect both variables.

3.3

(a)

- **Negative** correlation: older cars tend to be worth less.

(b)

- **No** correlation: the two are unrelated.

3.4

(a)

- The line rises $72 - 40 = 32$ marks over 4 hours, so 8 marks per hour.
- At 4 hours: $40 + 2 \times 8 = \mathbf{56}$.

(b)

- 20 hours is far outside the data (1 to 8 hours), so the trend may not continue.