# Real-world linear models with digital exploration

6 questions | 18 marks

Equivalent correct methods earn the corresponding marks.

**1.** A taxi charges AUD 6 plus AUD 3/km. Write a rule and find the 5 km charge. [3 marks]

Identify the fixed fee and rate.

Substitute $d = 5$.

**Answer:** $C = 6 + 3d$; AUD 21.

**2.** A container fills at 5 L/min from empty. Give the rule and volume at 6 minutes. [3 marks]

The starting volume is zero.

Multiply the rate by elapsed time.

**Answer:** $V = 5t$; 30 L.

**3.** A table gives time $t$ in minutes and volume $V$ in litres: $(t, V) = (0, 40), (1, 34), (2, 28)$. Suggest a linear rule and predict $V$ at $t = 5$. [3 marks]

The starting volume is 40 and each step loses 6.

At 5, $40 - 30 = 10$.

**Answer:** $V = 40 - 6t$; 10 L.

**4.** For $C = 10 + 2n$, make a table for $n = 0, 1, 2, 3$. [3 marks]

Substitute each input.

The output rises by 2 each time.

**Answer:** 10, 12, 14 and 16.

**5.** A 30 L tank drains at 3 L/min. A student predicts -6 L at 12 minutes. Explain the problem. [3 marks]

It empties when $30 - 3t = 0$, at 10 minutes.

After that the physical volume remains zero, not negative.

**Answer:** The model is valid only for $0 \le t \le 10$ minutes.

**6.** Inputs 0, 1, 2 and 3 are in spreadsheet cells A2:A5. Give a B2 formula for $C = 5 + 4d$ and the expected outputs. [3 marks]

The A2 reference supplies the input.

Filling down changes the row reference.

**Answer:** $=5+4*\mathrm{A2}$; outputs 5, 9, 13 and 17.