Forming linear equations from situations

6 questions | 12 marks

Equivalent correct methods earn the corresponding marks.

1. A printer charges AUD 12 setup and AUD 0.08 per page. Write C for p pages. [2 marks]

The setup is constant; multiply the page rate by the number of pages.

Answer: $C = 12 + 0.08p$.

2. A 24 cm candle burns down at 1.5 cm per hour. Write its height and useful time domain. [2 marks]

Subtract the amount burnt.

Set height to zero for the 16-hour endpoint.

Answer: $h = 24 - 1.5t$, $0 \le t \le 16$.

3. Temperature rises from 8 degrees Celsius at 6 am to 20 degrees at noon at a constant rate. Let t be hours after 6 am. Find $T(t)$. [2 marks]

The rate is $(20 - 8)/6 = 2$ degrees per hour.

Answer: $T = 8 + 2t$ for $0 \le t \le 6$.

4. An account starts with AUD 250 and receives AUD 40 each week, with no interest. Find its balance after 9 weeks. [2 marks]

$B = 250 + 40w$.

$B(9) = 250 + 360 = 610$.

Answer: AUD 610.

5. A linear cost is AUD 46 for 3 units and AUD 70 for 7 units. Find its rule. [2 marks]

$m = (70 - 46)/(7 - 3) = 6$.

$46 = 6(3) + b$ gives $b = 28$.

Answer: $C = 6n + 28$.

6. Interpret $M = 180 - 4t$, where mass is in grams and time in minutes. When does it become physically impossible? [2 marks]

Solve $180 - 4t = 0$.

For $t > 45$ the rule predicts negative mass.

Answer: Initial mass 180 g, loss 4 g/min; stop at 45 minutes.