Simple area and financial/application models

6 questions | 16 marks

Equivalent correct methods earn the corresponding marks.

1. A rectangle has width x m and length $x + 3$ m. Write its area as an expanded expression. [2 marks]

$x(x + 3) = x^2 + 3x$.

Answer: $A = (x^2 + 3x)$ m^2

2. A rectangle is x m wide and $x + 3$ m long, with area 40 m^2. Find its dimensions. [3 marks]

$x^2 + 3x - 40 = (x + 8)(x - 5) = 0$.

Reject $x = -8$; use $x = 5$.

Answer: 5 m by 8 m

3. Two consecutive positive integers have product 56. Find them. [3 marks]

$n(n + 1) = 56$, so $(n + 8)(n - 7) = 0$.

Only $n = 7$ is positive.

Answer: 7 and 8

4. A model gives revenue $R = n(10 - n)$. Find the revenue when $n = 3$. [2 marks]

$R = 3(10 - 3) = 3 \times 7 = 21$.

Answer: 21

5. For $R = n(10 - n)$, find whole-number counts giving revenue 24. [3 marks]

$n^2 - 10n + 24 = (n - 4)(n - 6) = 0$.

Both counts give a positive price.

Answer: $n = 4$ or 6

6. A cost model is $C = n^2 + 3n + 10$ dollars. Find the non-negative whole number of items when $C = 50$. [3 marks]

$n^2 + 3n - 40 = (n + 8)(n - 5) = 0$.

Reject $n = -8$; check $25 + 15 + 10 = 50$.

Answer: $n = 5$