Financial and other sequence applications

6 questions | 13 marks

Equivalent correct methods earn the corresponding marks.

1. A AUD 1500 balance grows 3% yearly with no payments. Find its value after two years. [2 marks]

$1500(1.03)^2 = 1591.35.$

Answer: $1591.35.$

2. A theatre begins with 18 seats in row 1 and adds two per row. Find total seats in 12 rows. [2 marks]

$\frac{12[36 + 11(2)]}{2} = 348.$

Answer: $348.$

3. A bouncing object travels 8 m on its first horizontal bounce and 75% as far on each later bounce. Find its ideal total. [2 marks]

$\frac{8}{1 - 0.75} = 32.$

Answer: $32\ \text{m}.$

4. AUD 100 is deposited at the start of each year for three years at 10% annual interest. Find the balance at the end of year 3. [2 marks]

$100[(1.1)^3 + (1.1)^2 + 1.1] = 364.1.$

Answer: $364.10.$

5. A AUD 600 debt grows 5% before each AUD 150 repayment. Find the balance after two repayments. [2 marks]

$B_1 = 480$ and $B_2 = 1.05(480) - 150 = 354.$

Answer: $354.$

6. A tree-count model assumes 20% growth yearly from 100 trees forever. Give its rule and one limitation. [3 marks]

A constant percentage gives the geometric model, but indefinite growth is physically implausible.

Answer: $T_n = 100(1.2)^n$; finite land/resources eventually limit growth.