Exponential growth and decay

6 questions | 14 marks

Equivalent correct methods earn the corresponding marks.

1. A quantity is multiplied by 1.07 monthly. State its percentage change. [2 marks]

1.07 is the original 1 plus 0.07.

Answer: 7% monthly increase.

2. Model 250 grams decreasing by 12% each day. [2 marks]

The retained factor is $1 - 0.12 = 0.88$.

Answer: $M(t) = 250(0.88)^t$, t in days.

3. For $N(t) = 300(1.2)^t$, find $N(2)$. [2 marks]

$300(1.44) = 432$.

Answer: 432

4. The equally spaced values are 5, 15, 45, 135. Does an exponential model fit? [2 marks]

Each next value divided by the previous one gives 3.

Answer: Yes: common multiplier 3.

5. Compare $L(t) = 20 + 5t$ and $E(t) = 20(1.25)^t$. [3 marks]

$L(t+1) - L(t) = 5$; $E(t+1)/E(t) = 1.25$.

Answer: L adds 5 per period; E adds 25% of its current value.

6. Will $B(t) = 80(0.5)^t$ equal zero at any finite real t? Explain. [3 marks]

$0.5^t > 0$ for every finite real t, so the product is positive.

Answer: No.