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]

$L(t+1)-L(t)=5$; $\frac{E(t+1)}{E(t)}=1.25$.

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.