

Solutions

2.1 $32=2^5$, so $x=5$.

2.2 The natural logarithm undoes exponentiation: $\ln(e^3)=3$.

2.3 Set $e^{(-0.2t)}=1/2$. Then $t=\ln(2)/0.2\approx 3.466$ to three decimal places.

2.4 False. A fitted exponential is a model, not a guarantee. Specify the time units and range of use. A negative k describes decay; a negative starting amount usually contradicts the context.

2.5 A The time for a decaying quantity to fall to half its initial value.

3.1 $t=\ln 4/0.2\approx 6.931$ time units. Half-life $\ln 2/0.2$ follows from a ratio $1/2$; the initial multiplier cancels. Extrapolation assumes the exponential model continues.