

$$t=1000 \rightarrow N=?$$

$$N = C e^{kt}$$

$$N_0 = C$$

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$$0.995 N_0 = N_0 e^{12k}$$

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$$\ln(0.995) = 12k$$

$$-0.000417 = k$$

$$N = N_0 e^{-0.000417t}$$

$$N = N_0 e^{-0.000417(1000)} = 0.697 N_0$$

$$100 - 65.3 = 34.7\%$$

$$\frac{N_0}{2} = N_0 e^{-0.000417t}$$

$$\ln\left(\frac{1}{2}\right) = -0.000417t$$

$$1662.123 = t$$

years

$$19) T = T_s + C e^{kt}$$

$$T_s = 20$$

$$t=1 \rightarrow T=35$$

$$t=2 \rightarrow T=27.5$$

$$t=0 \rightarrow T=?$$

$$35 = 20 + C e^k$$

$$27.5 = 20 + C e^{2k}$$

$$15 = C e^k$$

$$7.5 = C e^{2k} \quad \uparrow \div \quad \frac{1}{2} = e^k \rightarrow \ln \frac{1}{2} = k$$

$$-0.69 = k$$

$$15 = C (-0.69)$$

$$29.9 = C$$

$$T = 20 + 29.9$$

$$T = 49.9$$

$$22) T = T_s + C e^{kt}$$

$$t=0 \rightarrow T=50$$

$$T_s = 37.5$$

$$t=75 \rightarrow T=72.5$$

$$t=? \rightarrow T=150$$

$$t = 81.7 \text{ yr}$$