

# Lesson 31 Problems

## Problem 1

Solve for  $k$  in

$$t_{1/2} = \frac{0.6931}{k}$$

where  $T_{1/2} = 21600 \text{ s} \Rightarrow k = 3.2 \cdot 10^{-5}$

and solve for

$$N = 0.5 \text{ micrograms}$$

$$\cdot \frac{1 \text{ gram}}{1000000 \mu\text{g}}$$

$$\cdot \frac{1 \text{ mol}}{99 \text{ g}} = 5.1 \cdot 10^{-9}$$

or Avogadro's  
 $\sqrt{= 3.0 \cdot 10^{15}}$

Thus,

$$A = kN = 9.7 \cdot 10^{10}$$

## Problem 2

By the equation

$$A = A_0 e^{-kt}$$

, plug in  $28.3 = 32.5 e^{-5715 t}$

~~lets convert to cent's per year~~

Solve for  $k$  in

$$5715 \text{ y} = 3 \cdot 10^9 \text{ minutes} = \frac{0.6931}{k} \Rightarrow k = 2.3 \cdot 10^{-10}$$

then find  $t$  in

$$28.3 = 32.5 e^{-2.3 \cdot 10^{-10} t} \Rightarrow t = 496.8 \text{ years.}$$

### Problem 3

$$1.3 \cdot 10^4$$

## Problem 4

Greater than