You can solve this problem by two ways.

(a) Counting the number of half-lives. That is how many times the initial quantity has been reduced by half.

$$1\ \mathrm{yr} \times \frac{365\ \mathrm{d}}{1\ \mathrm{yr}} \times \frac{1\ \text{half-life}}{44.5\ \mathrm{d}} = 8.20\ \text{half-lives}$$

$$0.56\mathrm{mg} \times \left(\frac{1}{2}\right)^{8.2} = 0.0019\mathrm{mg}$$

(b) Determining the value of *k* from the half-life, and then use the equation $\mathrm{N_t} = \mathrm{N_0 e^{-kt}}$

$$\mathrm{k} = \frac{\ln 2}{44.5\ \mathrm{d}} = 1.56 \times 10^{-2}\mathrm{d}^{-1}$$

$$-kt = -1.56 \times 10^{-2}\mathrm{d}^{-1} \times 365d = -5.69$$

In a sample of pure isotopic substance, the mass (m) is directly proportional to the number of atoms (N), so $\mathrm{m_t} = \mathrm{m_0 e^{-kt}}$

$$\mathrm{m_t} = \mathrm{m_0 e^{-5.69}} = 0.56\mathrm{mg} \times 0.0034 = 0.0019\mathrm{mg}$$