Problem 18

Roughly how many times longer than the mean life of an extremely unstable atomic nucleus is the lifetime of a human?

Solution

According to Figure 1.4 on page 10,

$$10^{-22}\text{ s} = \text{unstable nucleus lifetime}$$

$$10^{9}\text{ s} = \text{human lifetime.}$$

Divide the human lifetime by the nucleus lifetime to get the number of times longer that a human lifetime is.

$$\#\text{ of times longer} = \frac{\text{Human Lifetime}}{\text{Nucleus Lifetime}} \approx \frac{10^{9}\text{ s}}{10^{-22}\text{ s}} = 10^{31}$$