Exercise 335

For the following problems, consider radioactive dating. A human skeleton is found in an archeological dig. Carbon dating is implemented to determine how old the skeleton is by using the equation $y = e^{rt}$, where y is the ratio of radiocarbon still present in the material, t is the number of years passed, and $r = -0.0001210$ is the decay rate of radiocarbon.

If the skeleton is expected to be 2000 years old, what percentage of radiocarbon should be present?

Solution

Plug in $t = 2000$ into the given equation.

$$\begin{aligned} y &= e^{rt} \\ &= e^{(-0.0001210)(2000)} \\ &\approx 0.785056 \end{aligned}$$

Multiply this decimal by 100 to change it to a percent: 78.51%. This is the percentage of radiocarbon remaining in the skeleton after 2000 years.