

Use with textbook pages 302-309.

Calculating half-life

1. A radioactive isotope has a half-life of 10 minutes.

(a) What fraction of the parent isotope will be left after 30 minutes?

(b) What percent of the parent isotope will be left after 40 minutes?

(c) What fraction of the daughter isotope will be present after 20 minutes?

(d) What percent of the daughter isotope will be present after 50 minutes?

2. A 36 g sample of a radioactive isotope decayed to 4.5 g in 36 minutes. How much of the original parent isotope would remain after the first 12 minutes?

3. The half-life of a particular radioactive isotope is 8 hours. What percent of the parent isotope would remain after 1 day? _____

4. A radioactive isotope sample has a half-life of 4 days. If 6 g of the sample remains unchanged after 12 days, what was the initial mass of the sample?

5. Suppose the ratio of a radioactive parent isotope to a stable daughter isotope within a rock sample is 1:3. The half-life of the parent isotope is 710 million years. How old is the rock sample? _____

6. A rock sample was dated using potassium-40. Measurement indicates that $\frac{1}{8}$ of the original parent isotope is left in the rock sample. How old is the rock sample?

7. When a sample of lava solidified, it contained 28 g of uranium-238. If that lava sample was later found to contain only 7 g of U-238, how many years had passed since the lava solidified? _____

8. After 25 years, the number of radioactive cobalt atoms in a sample is reduced to $\frac{1}{32}$ of the original count. What is the half-life of this isotope? _____

9. The half-life of Sr-90 is 28 years. If an 80 g sample of Sr-90 is currently in a sample of soil, how much Sr-90 will be present in the soil 84 years later? _____