Half-Life

1. $N = \frac{N_0}{2^n}$

$\frac{N}{N_0} = \frac{12.5}{100} = \frac{1}{8} = \frac{1}{2^3}$

$n = \frac{t}{T_{1/2}}$ $\quad T_{1/2} = \frac{t}{n} = \frac{21.6}{3} = \underline{7.2\ s}$

2. $\frac{N}{N_0} = \frac{100}{800} = \frac{1}{8} = \frac{1}{2^n} = \frac{1}{2^3}$

$T_{1/2} = \frac{t}{n} = \frac{639000}{3} = \underline{213000\ y}$

3. $\frac{N}{N_0} = \frac{13}{208} = \frac{1}{16} = \frac{1}{2^n} = \frac{1}{2^4}$

$T_{1/2} = \frac{t}{n} = \frac{60}{4} = \underline{15\ h}$

4. $\frac{N}{N_0} = \frac{6.25}{50} = \frac{1}{8} = \frac{1}{2^n} = \frac{1}{2^3}$

$n = \frac{t}{T_{1/2}}$ $\quad t = n T_{1/2} = 3(8.10) = \underline{24.3\ d}$

5. $\frac{N}{N_0} = \frac{1}{4} = \frac{1}{2^n} = \frac{1}{2^2}$

$t = n T_{1/2} = 2(0.025) = \underline{0.05\ s}$

6. $\frac{N}{N_0} = \frac{11.25}{360} = \frac{1}{32} = \frac{1}{2^n} = \frac{1}{2^5}$

$t = n T_{1/2} = 5(21.6) = \underline{108\ h}$

7. $n = \frac{t}{T_{1/2}} = \frac{62}{12.4} = 5$

$N = \frac{N_0}{2^n} = \frac{848}{2^5} = \underline{26.5\ g}$

8. $n = \frac{t}{T_{1/2}} = \frac{1.719 \times 10^4}{5730} = 3$

$N = \frac{N_0}{2^n} = \frac{144}{2^3} = \underline{18\ g}$

9. $n = \frac{t}{T_{1/2}} = \frac{2.82 \times 10^9}{7.04 \times 10^8} = 4$

$N = \frac{N_0}{2^n} = \frac{12.5}{2^4} = 0.78\,g$