

1. Chris invests \$3000 at 6% per annum compounded annually. How many years will it take for his investment to triple in value? (to the nearest year).

$$A = P(1 + r/n)^{nt}$$

$$3 = (1.06)^t \quad \checkmark$$

$$t = \log 3 / \log 1.06$$

$$t = 19 \text{ years} \quad \checkmark$$

2. Mr. Sanchez was working late in the Chemistry lab and discovered a new element. He named it Alicium because it glowed almost as radiant as his sweetheart. After 45 days, only 62% of the original sample remained. What is the half-life of Alicium? (to the nearest tenth of a day).

$$P = P_0(0.62)^{t/45}$$

$$\frac{1}{2} = (0.62)^{t/45} \quad \checkmark$$

$$t = 45 \times \frac{\log 1/2}{\log 0.62} = 65.2 \text{ days} \quad \checkmark$$

3. The population of an ant nest can increase five-fold in 4 weeks. If the original ant population is 300, find the population in 25 weeks.

$$P = 300(5)^{t/4} \quad \checkmark$$

$$= 300(5)^{25/4}$$

$$= 7\,009\,447 \quad \checkmark$$

4. How many times as intense was the earthquake in Alaska in 1964 than the earthquake in Turkey in 1966? (to the nearest tenth)

Alaska – Magnitude of the earthquake = 8.9

Turkey – Magnitude of the earthquake = 6.4

$$10^{8.9-6.4} \approx 316 \quad \checkmark$$

About 316 times as intense.

5. Due to acid rain, the pH value of a lake became 4.7, killing all the fish. In order to support fish, the acidity of the lake must be decreased eight-fold. What will the new pH of the lake be in order to support fish life? (to the nearest tenth)

$$10^{x-4.7} = 8 \quad \checkmark$$

$$x-4.7 = \log 8$$

$$x = \log 8 + 4.7$$

$$= 5.6 \quad \checkmark$$