5D HW (HL & SL) #1, 3, 5

1.) $u_0 = 500 \quad r = 1.12$

a.) i.) $500(1.12)^{10} \approx 1,552.92 \approx$ **1,553 ants**

ii.) $500(1.12)^{20} \approx 4,823.15 \approx$ **4,823 ants**

b.) $\frac{500(1.12)^n}{500} = \frac{2000}{500}$ $\quad (1.12)^n = 4$ $\quad \log_{(1.12)}(4) = n$

$\approx 12.23 = n$ $\quad \approx$ **12.2 weeks**

3.) $u_0 = 32, \; r = 1.18$ a.) i.) $32(1.18)^5 \approx 73.2 \approx$ **73 deer**

ii.) $32(1.18)^{10} \approx 167.4 \approx$ **167 deer**

b.) $\frac{5000}{32} = \frac{32(1.18)^n}{32} \Rightarrow 1.18^n = 156.25$ $\quad \log_{1.18}(156.25) = n$

$n \approx 30.519 \approx$ **30.5 years**

5.) $r = 1 - 0.18 = 0.82 \quad u_4 = 1.52 \quad \therefore \frac{1.52}{(0.82)^4} = \frac{u_1(0.82)^4}{(0.82)^4}$

$\Rightarrow$ **$u_1 = 3.36$ g**

b.) $\frac{0.2}{3.36} = \frac{3.36(0.82)^n}{3.36} \Rightarrow (0.82)^n = \left(\frac{0.2}{3.36}\right) \Rightarrow \log_{0.82}(0.2/3.36) = n$

$\therefore n \approx 14.2$

$\therefore 14.2 - 4 =$ **10.2 years**