1.1. $-18,75 = a(9,5) + b(-7)$

$28,375 = a(-18,75) + b(9,5)$.

$\therefore a = -\frac{1}{2}$, $b = 2$.

1.2. $9,5 = -\frac{1}{2}(-7) + 2(T_1)$

$3 = T_1$.

2. $T_0 = 650$

$T_1 = (1+20\%)T_0 + T_0(1+\frac{18\%}{12})$

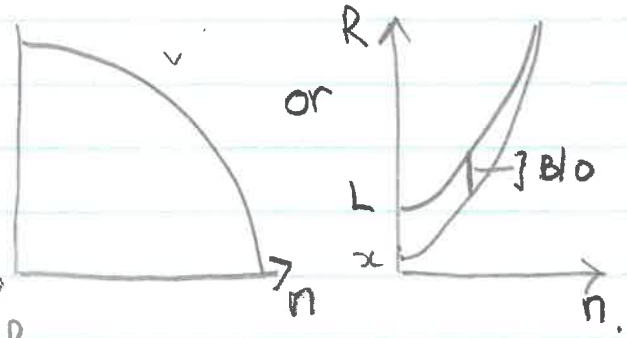
$T_2 = (1+20\%)(1+20\%)T_0 + T_1(1+\frac{18\%}{12})$

$T_3 = (1+20\%)^3 T_0 + T_2(1+\frac{18\%}{12})$

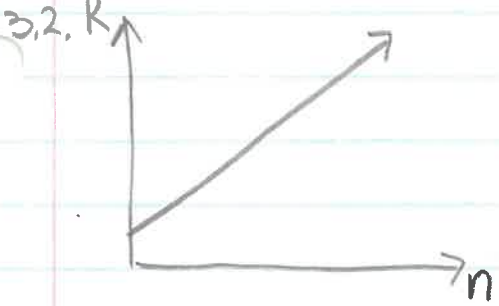
$\therefore T_n = (1+20\%)^n T_0 + T_{n-1}(1+\frac{18\%}{12})$

$T_0 = 650$

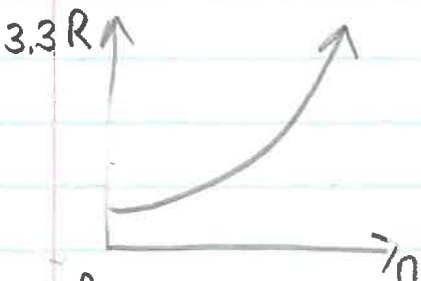
3.1.



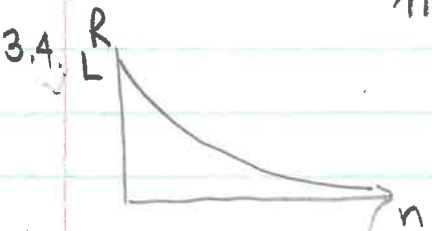
3.2.



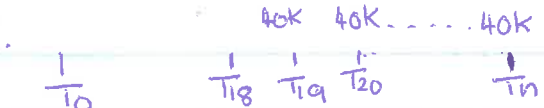
3.3



3.4.



4.1.



$(A) = (1+\frac{9,75\%}{12})$

$3\times10^6 (A)^n = \frac{40\times10^3((A)^{n-18}-1)}{(A)-1}$.

$n = 168$ months.

ie 14 years.

4.2.

$B.0 = 3\times10^6 (A)^{78} - \frac{40.10^3((A)^{60}-1)}{(A)-1}$.

$= 2562432,476$

Invest 1,2 million

$\therefore$ 1362432,47 is in bank.

$136... (A)^n = \frac{15k((A)^n-1)}{(A)-1}$.

$n = 165$ months.

13 and 3/4 years.

5. $P_{n+1} = P_n(1+r)$

5.1. SA : $P_{n+1} = P(1+0,0083)$

$r = 0,0083$ increasing.

G : $P_{n+1} = P(1-0,0006)$

$r = 0,0006$ decreasing

5.2. SA. $A = 55\,436\,360(1+0,0083)^n$

G. $A = 80\,636\,124(1-0,0006)^n$

$n = 42,26...$

ie $n = 43$ years.

6.1. $r = b - d$.

$b = \text{surv rate} \times \%\text{fem} \times \frac{\text{litter}}{\text{size}} \times \frac{\text{litters}}{\text{cyc}}$

$= 70\% \times 55\% \times 3 \times {}^{2}/_{1}$.

$d = {}^{\text{cycle}}/_{\text{lifespan}}$

$= {}^{1}/_{7}$

$\therefore r = \frac{1517}{700}$

$= 2,1671$.

$P_0 = 21$

$P_1 = 21,25..$

$P_2 = 21,504..$

$P_3 = 21,759...$

$P_4 = 22,017..$

$P_5 = 22,277..$

$P_6 = 22,539..$

$P_7 = 22,803..$

$P_8 = 23,070$

6.2. $P_{n+1} = P_n(1 + 2,17)$

ie $P_8 = 23$.

6.3. $P_0 = 15$.

$P_1 = 47,55$

$P_2 = 150,7335$

$P_3 = 477,825..$

$P_4 = 1514,705..$

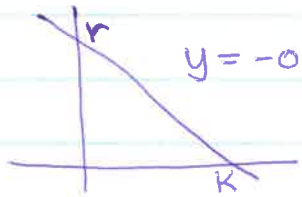
$P_5 = 4801,617..$

$P_6 = 15221,127..$

$P_7 = 48250,975..$

$\therefore 48250$.

7.1.



$y = -0,0002x + 0,0213$.

a) $r = 0,0213$.

b) $K = \frac{0,0213}{0,0002} = 106$.

c) $\frac{\Delta P}{P} = -\frac{r}{K} P_n + 6$.

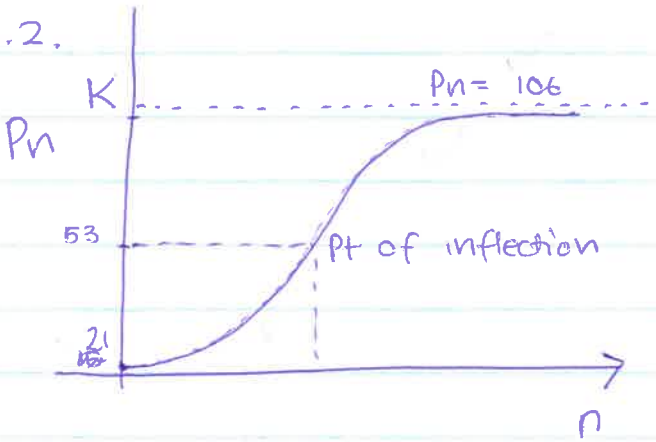
$= -0,0002(32) + 0,0213$

$= 0,0149$.

d.) $P_{n+1} = P_n + rP_n\left(1 - \frac{P_n}{K}\right)$

$= P_n + 0,0149\, P_n\left(1 - \frac{P_n}{106}\right)$

7.2.



8. ~~$P_{n+1} = P_n + aR_n\left(1 - \frac{R_n}{K}\right) - bR_nF_n$~~

8.1 + 8.2: $R_{n+1} = R_n$

$a\left(1 - {}^{R_n}/_{K}\right) = bF_n$.

~~$F_{n+1} = F_n + fbR_nF_n - cF_n$~~

$F_{n+1} = F_n$

$\therefore fbR_n = c$.

$\therefore R_n = \frac{c}{fb}$.

$\therefore a\left(1 - \frac{c}{fbK}\right) = bF_n$.

$\therefore F_n = \frac{a}{b}\left(1 - \frac{c}{fbK}\right)$

9.1. Pred 30 ✓
Prey 70. ✓

9.2. a) Prey
max 500 ✓
min 10 ✓
b) Predator
max 50 ✓
min 20. ✓

9.3. Low # predators ✓
∴ ↑ growth rate of ✓
prey.
Some could have been introduced as it is so steep.