PSTAT 171 HW #2

2.2) 5.) $3C = C(1+0.8)^T$

$3 = 1.8^T$

$\ln(3) = T \cdot \ln(1.08)$

$T_8 = \frac{\ln 3}{\ln(1.08)} = \underline{14.274915}$

$T_4 = \frac{\ln(3)}{\ln(1.04)} = \underline{28.011629}$

$T_{12} = \frac{\ln(3)}{\ln(1.12)} = \underline{9.694035}$

$14.2749 = n/.08$ $\boxed{n = \underline{114}}$

$\boxed{i_{.05} = 28.011}$ $\boxed{i_{.12} = 9.694}$

6.) Anne

$12000 = \frac{6000}{(1+i)^2} + \frac{8000}{(1+i)^4}$

Frank

$12000 = \frac{15000}{(1+i)^t}$ $x = (1+i)^{-2}$

$8x^2 + 6x - 12 = 0$

$\hookrightarrow 4x^2 + 3x - 6 = 0$

$x = \frac{-3 \pm \sqrt{9 - 4(-6)(4)}}{8}$

$(1+i)^{-2} = .9059$ || $(.9059)^{-\frac{1}{2}} - 1 = i$

$i = \underline{.0507}$ $12 = \frac{15}{(1.0507)^T}$

$t \cdot \ln(1.0507) = \ln(15/12)$

$\boxed{t = 4.514 \text{ yrs}}$

2.3) 3) $A_1 = 20000(1+.06)^t$

$A_2 = P_1 (1 + \frac{r}{100})^t$

$P = A_1 - 10000$

$= 20000(1.06)^t - 1000$

$A_2 = (20000(1.06)^t - 10000)(1+.06)^t$

$\frac{20000}{2000}(1.06)^t - \frac{10000}{2000}(1.06)^t = \frac{12000}{2000}$

$10(1.06)^t - 5(1.06)^t - 6 = 0$

$(1.06)^t = \frac{5 \pm \sqrt{265}}{20}$

$(1.06)^t = 1.0639$ (time is positive)

$t = \frac{\ln(1.0639)}{\ln(1.06)}$

$\boxed{t = 1.069 \text{ years}}$

11.) a) $400 + \frac{300}{1.24} = \frac{x}{1.48}$ $\boxed{x = 950.06}$

b) $x = 300(1.24) + 400(1.48)$

$\boxed{x = 964}$

c) This is because money can have different values at different times, thus allowing the equations to be equal to eachother at distinct times.

d) $400 + \frac{300}{(1.06)^4} = \frac{x}{(1.06)^8}$

(a) $400(1.06)^8 + 300(1.06)^4 = x$

$x = 1016.28$

(b) $300(1.06)^4 + 400(1.06)^8 = x$

$x = 1016.28$

2.4) 4.)

A $-2000000 + \frac{3200000}{(1+i)^6} = 0$

$\frac{32}{(1+i)^6} = 20$

$32 = 20(1+i)^6$

$1.6 = (1+i)^6$ $\boxed{i_A = 8.148\%}$

B $1000000 - \frac{2200000}{(1+i)^3} + \frac{800000}{(1+i)^2} = 0$

$10(1+i)^3 - 22 + 8(1+i) = 0$ where $x = (1+i)$

$10x^3 - 22 + 8x = 0$

$x = 1.0975$ $1.0975 = 1+i$

$\boxed{i_B = 9.75123\%}$

C $1000000 - \frac{8000000 - 350000}{(1+i)^2} = 0$

$100 - \frac{115}{(1+i)^2} = 0$

$100(1+i)^2 - 115 = 0$

$(1+i)^2 = \frac{115}{100}$

$(1+i) = \sqrt{\frac{115}{100}}$

$\boxed{i_C = 7.23805\%}$

D $\frac{2200000}{(1+i)^3} + \frac{350000}{(1+i)^2} - \frac{3200000}{(1+i)^6} = 0$

$\frac{220}{(1+i)^3} + \frac{35}{(1+i)^2} - \frac{320}{(1+i)^6} = 0$

$\Rightarrow 220(1+i)^3 + 35(1+i)^4 - 320 = 0$ $\boxed{i_D = 7.495\%}$

2.4.5) $85720.80 + 28500v^2 = 27074v + 10000$

- $v = .94$ being plugged in results in the value 33,755.40 being common
- $v = .95$ being plugged in results in the value 34,294.05 being common
- $v = .96$ being plugged in results in the value 34,838.40 being common

$\frac{1}{.94} - 1 = \underline{6.3829\%}$

$\frac{1}{.95} - 1 = \underline{5.2632\%}$

$\frac{1}{.96} - 1 = \underline{4.1666\%}$

2.5) 3) **A** $-6000 - 17000 + \frac{7000}{(1+i)^2}(1.05)^2 + \frac{22500}{(1+i)^4}$

$-23000x^2 + 7717.5x + 22500 = 0$

$x = (1+i)^2$

$(1+i)^2 = \frac{-7717.5 \pm \sqrt{7717.5^2 - 4(-23000)(22500)}}{-2(23000)}$

$(1+i)^2 = 1.171$

$1+i = 1.171^{1/2}$ $\boxed{i_A = 7.06134\%}$

B

$6000 - \frac{7000}{(1+i)^2} = 0$

$6000(1+i)^2 = 7000$

$(1+i)^2 = 7/6$

$\boxed{i_B = 8.01234\%}$

C $17000 - \frac{22500}{(1+i)^4} = 0$

$17000(1+i)^4 - 22500 = 0$

$(1+i)^4 = \frac{225}{170}$ $i = \sqrt[4]{\frac{225}{170}} - 1$

$\boxed{i_C = 7.25891\%}$

2.6) 3) $290000(1.084)^2 = 322165.64$

$322165.64 - 290000 = 32165.4$

$448000 = 322165.64 + x$

$x = 125834.36$

$34000 = 32165.64 + y$

$y = 1834.36$

$125843.36 - 1834.36 = 124000$

$125842.36 = 124000(1.54)^t$

$\underline{\underline{t = .279}}$

$0.279(366) = 102.174$

This would result in approx

$\underline{\underline{\text{Sept } 26, 1996}}$ as the day

2.7) 3) Can be written as the equation:

$$1.16 = \left(\frac{1230000}{1205000}\right) + \left(\frac{x}{2030000}\right)$$

$$1.16 = 1.02075 + \left(\frac{x}{2030000}\right)$$

$$\frac{1.16}{1.02075} = \frac{x}{2030000}$$

$$1.13642 = \frac{x}{2030000}$$

$$\boxed{x = \$2306938.21}$$

Ch. 2 Review) 5)

$B_0 = 24500$, $B_{\frac{17}{12}-} = 28212$,

$B_{\frac{17}{12}+} = 18212$, $B_{\frac{23}{12}-} = 15892$,

$B_{\frac{23}{12}+} = 23892$, $B_3 = 30309$

a) $\frac{28212}{24500} \times \frac{15892}{18212} \times \frac{30309}{23892} = 1.275$

$$1.275 = (1+i)^3$$

$$1+i = 1.275^{1/3}$$

$$\boxed{i = 8.42664\%}$$

b) $$i \approx \frac{30309 - 24500 + 10000 - 8000}{24500 + 10000\left(1 - \frac{16}{36}\right) - 8000\left(1 - \frac{23}{36}\right)}$$

$$= \underline{\underline{.3576}}$$

$$(1+i)^3 = .3576$$

$$i = \sqrt[3]{.3576} - 1$$

$$\boxed{i = 10.7297\%}$$

d) The inequality b/t the Utopia Fund and the Abiyote dollar-weight yield is the result of their non-linear relationship + ratios.