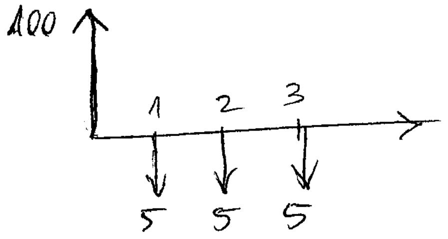
FINAL SEPT. 1-9-2012

$\boxed{1.}$

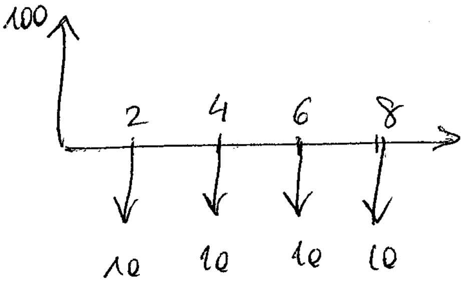
a)



$$100 = \sum_{j=1}^{\infty} \frac{5}{(1+x)^j} = 5 \sum_{j=1}^{\infty} \frac{1}{(1+x)^j} = \frac{5}{x}$$

$$\Rightarrow \boxed{x = \frac{100}{5} = 5\%}$$

b)



$$100 = \sum_{j=1}^{\infty} \frac{10}{(1+x)^{2j}} = 10 \sum_{j=1}^{\infty} \frac{1}{(1+x)^{2j}} \Rightarrow$$

$$\Rightarrow \cancel{100 = \frac{10}{1 - \frac{1}{(1+x)^2}} = \frac{10}{\frac{(1+x)^2 - 1}{(1+x)^2}}}$$

$$\cancel{\Rightarrow 10 = \frac{(1+x)^2}{(1+x)^2 - 1} \Rightarrow 10 = \frac{y}{y-1} \Rightarrow}$$

$$\cancel{\Rightarrow 10y - 10 = y \Rightarrow 9y = 10 \Rightarrow y = \frac{10}{9}}$$

$$\cancel{\Rightarrow (1+x)^2 = \frac{10}{9} \Rightarrow x = \sqrt[2]{\frac{10}{9}} - 1 = \frac{1}{3}}$$

$$\Rightarrow 10 = \frac{1/(1+x)^2}{1 - 1/(1+x)^2} \quad ; \quad y = \frac{1}{(1+x)^2}$$

$$\Rightarrow 10 = \frac{y}{1-y} \Rightarrow 10 - 10y = y \Rightarrow 11y = 10 \Rightarrow y =$$

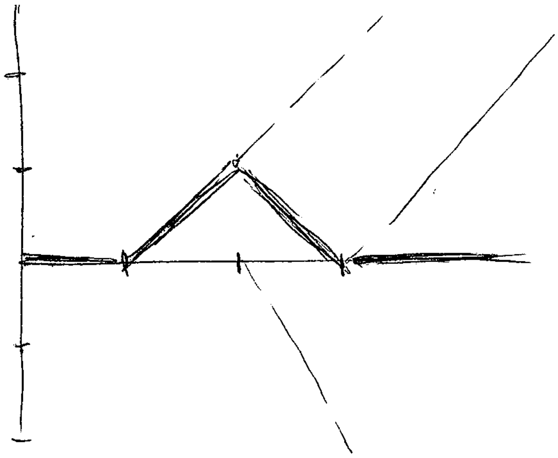
$$\Rightarrow \frac{10}{11} = \frac{1}{(1+x)^2} \Rightarrow (1+x)^2 = \frac{11}{10} \Rightarrow 1 + 2x + x^2 = \frac{11}{10}$$

$$\Rightarrow \boxed{x = 0'0488 = 4'88\%}$$

2.) a) call compr. str. K

2 calls vend. str. 2K

call compr. str. 3K



b) $C - P = S_0 - Ke^{-rT}$

$\Rightarrow C_i = S_0 - iKe^{-RT} + P_i \qquad i = 1,2,3$

precio cartera: $C_1 - 2C_2 + C_3 =$

$= \cancel{S_0} - \cancel{Ke^{-RT}} + P_1 - \cancel{2S_0} + \cancel{4Ke^{-RT}} - 2P_2 + \cancel{S_0} -$

$- \cancel{3Ke^{-RT}} + P_3 = \boxed{P_1 + P_3 - 2P_2}$

3. No cae

4. a) $y \in \mathbb{R}$ (los precios hoy no son influyentes en la completitud del mercado).

Buscamos $x \in \mathbb{R}$: $\det(\cdot) \neq 0$

$0 - 1 + 0 - 0 - 1 + x \neq 0 \Rightarrow \boxed{x \neq 2}$

$\Rightarrow$ Mercado completo si $x \in \mathbb{R} \setminus \{2\}$

b)

$1 \begin{cases} 1 \\ 1 \\ 1 \end{cases} \qquad 0 \begin{cases} -1 \\ 0 \\ 1 \end{cases} \qquad \frac{y}{0'9} \begin{cases} 0 \\ 1 \\ 3 \end{cases}$

$$\begin{cases} 1 = P_1 + P_2 + P_3 \\ 0 = -P_1 + P_3 \Rightarrow P_3 = P_1 \\ \dfrac{y}{0'9} = P_2 + 3P_3 \end{cases} \longrightarrow 1 = 2P_1 + P_2 \Rightarrow \underbrace{P_2 = 1 - 2P_1}_{P_1 \in (0, 1/2)}$$

$$\Rightarrow \frac{y}{0'9} = 1 - 2P_1 + 3P_1 = 1 + P_1 \Rightarrow \frac{y}{0'9} = 1 + P_1 \Rightarrow$$

$$\Rightarrow y = 0'9 + 0'9 P_1$$

Como $P_1 \in (0, 1/2)$ $\xrightarrow{P_1=0} y = 0'9$, $\xrightarrow{P_2 = 1/2} y = 1'35$ $\Rightarrow \boxed{y \in (0'9, 1'35)}$

5. Brain

6.

$$K_{esp} = \frac{1}{\Delta T}\left(\frac{P(0,T)}{P(0,T+\Delta T)} - 1\right)$$

$$P(0,1) = 0'96 \Rightarrow 0'03 = \frac{1}{0'5}\left(\frac{0'96}{x} - 1\right) \Rightarrow$$

$$\Rightarrow 0'015 + 1 = \frac{0'96}{x} \Rightarrow \boxed{x = \frac{0'96}{1'015} = 0'9458}$$

7.

$$P(0,T) = (1+RT)^{-1} \longrightarrow P(0,1) = \frac{1}{1'03} = 0'971$$

$$K_{esp} = \frac{100}{0'971} = 103\ €$$

Como $101'5 \neq 103 \Rightarrow \exists$ OA.