FINAL MAYO 23-5-12

1.

a) $C_j = C_{j-1}(1+R) + 2^j \cdot a \quad , \quad C_0 = a$

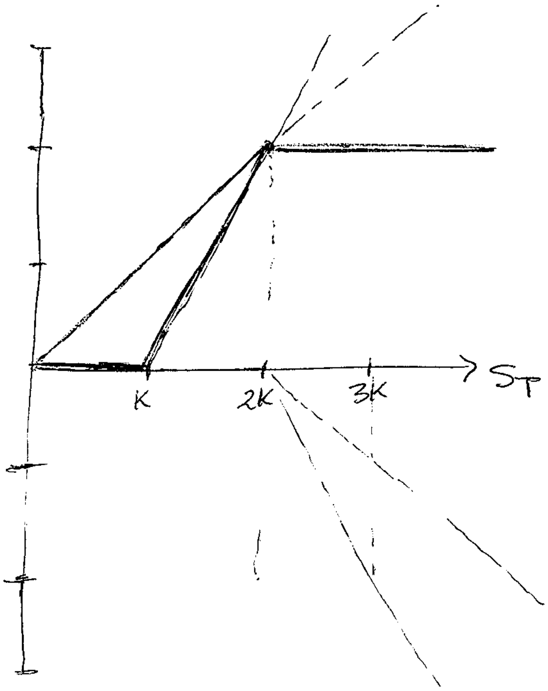
$$C_{19} = a(1+R)^{19} + 2^{19} a \frac{(1+R)^{19} - 1}{R}$$

$$C_{20} = (1+R)C_{19} = a(1+R)^{20} + 2^{19} a \frac{(1+R)^{10} - (1+R}{R}$$

b) $$\frac{C_{20}}{(1+TIR)^{20}} = \sum_{j=0}^{19} \frac{2^j \cdot a}{(1+TIR)^j} \Rightarrow C_{20} = \sum_{j=0}^{19} 2^j a (1+TIR)^{20-j}$$

¿suficiente?

2.

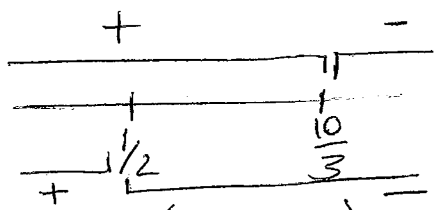


flujo cartera 2 $\geq$ flujo C1

$\Downarrow$

precio (C2) > precio (C1)

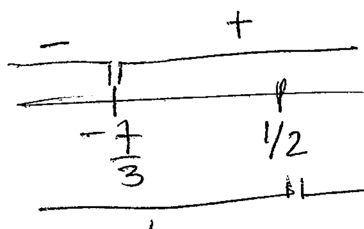
3.



$$\frac{\frac{10}{3} - x}{1-2x} > 0 \Rightarrow x \in \left(-\infty, \tfrac{1}{2}\right) \cup \left(\tfrac{10}{3}, \infty\right)$$

$x \in \left(\frac{10}{3}, \infty\right)$

intersección



$$\frac{\frac{10}{3} - x}{1-2x} < \frac{1}{2} \Rightarrow \cancel{\frac{7/3 + x}{2(1-2x)} < 0} \text{ MAL}$$

$\boxed{x \in \left(\tfrac{1}{2}, \infty\right)}$ ~~$x \in \left(-\infty, -\tfrac{1}{3}\right) \cup \left(\tfrac{1}{2}, \infty\right)$~~

4. No entra

$e^{a\ln(b)} = \left[e^{\ln(b)}\right]^a = b^a$

5.

$$\boxed{F_s(0,t_1,t_2) = \frac{1}{t_2-t_1}\left(\frac{P(0,t_1)}{P(0,t_2)} - 1\right)} \to \text{despejar } P(0,t_2)$$

$$(t_3-t_2)\,F_c(0,t_2,t_3) = \ln\left(\frac{P(0,t_2)}{P(0,t_3)}\right) \Longrightarrow$$

$$\Longrightarrow e^{(t_3-t_2)F_c(0,t_2,t_3)} = \frac{P(0,t_2)}{P(0,t_3)} \Longrightarrow$$

$$\Rightarrow \boxed{P(0,t_3) = P(0,t_2)\cdot \exp\left(-(t_3-t_2)F_c(0,t_3,t_2)\right)}$$

6. ec. paridad call-put: $c - p = S_0 - Ke^{-rT}$

$$\frac{\partial p}{\partial S} = \frac{\partial}{\partial S}\left(c - S + Ke^{-rT}\right) = \frac{\partial c}{\partial S} - 1$$

$$\Longrightarrow \boxed{\frac{\partial p}{\partial S} = \Phi(d_+) - 1}$$

7.

$$c \;\begin{cases} c(1+R) \\ c(1+R) \end{cases} \qquad S_0 \;\begin{cases} S_0(1+u) \\ S_0(1-d) \end{cases}$$

$$\frac{c}{S_0} \;\begin{cases} \dfrac{c(1+R)}{S_0(1+u)} \\[2ex] \dfrac{c(1+R)}{S_0(1-d)} \end{cases} \qquad 1 \;\begin{cases} 1 \\ 1 \end{cases}$$

$$\begin{cases} p+q = 1 \\ \dfrac{\cancel{c}(1+R)}{\cancel{S_0}(1+u)}\,p + \dfrac{\cancel{c}(1+R)}{\cancel{S_0}(1-d)}\,q = \dfrac{\cancel{c}}{\cancel{S_0}} \end{cases} \longrightarrow (1+R)\left[\frac{p}{(1+u)} + \frac{q}{(1-d)}\right] = 1$$

$$p = 1 - q$$

$$(1+R)\left[\frac{1-q}{(1+u)} + \frac{q}{(1-d)}\right] = 1 \Rightarrow \frac{(1-q)(1-d)+q(1+u)}{(1+u)(1-d)} = (1+R)^{-1}$$

$$\Rightarrow (1-q)(1-d) + q(1+u) = \frac{(1+u)(1-d)}{(1+R)} \Rightarrow$$

$$\Rightarrow 1 - d - q + qd + q + qu = \frac{(1+u)(1-d)}{(1+R)} \Rightarrow$$

$$\Rightarrow 1-d + q(d+1+u-1) = \frac{(1+u)(1-d)}{(1+R)}$$

$$\Rightarrow (d+u)q = \frac{(1+u)(1-d)}{(1+R)} - 1 + d \Rightarrow q = \frac{(1+u)(1-d)}{(1+R)(u+d)} + \frac{d-1}{d+u}$$

$$\Rightarrow q = \frac{(1+u)(1-d) + (d-1)(1+R)}{(1+R)(u+d)} =$$

$$\Rightarrow \boxed{q = \frac{(u-R)(1-d)}{(1+R)(u+d)}}$$

$$\boxed{p = 1 - q}$$

Para que no haya OA: $q \in (0,1) \Rightarrow \begin{cases} p \in (0,1) \\ p+q = 1 \end{cases}$

por construcción

8.