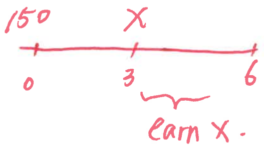
1. $xe^{\int_3^6 \delta(t)dt} + 150e^{\int_0^6 \delta(t)dt} - (x+150e^{\int_0^3 \delta(t)dt}) = x.$



$xe^{\frac{6^2-3^2}{200}} + 150e^{\frac{6^2}{200}} - x - 150e^{\frac{3^2}{200}} = x.$

$1.14x + 179.58 - x - 156.90 = x$

$x \approx 26.37$

2. Kelly: $a(t) = 1+0.04t$

Tara: $a'(t) = e^{\int_0^t \frac{1}{r+k}dt} = \frac{t+k}{k}$

$X[a(8)-a(4)] = X[a'(8)-a'(4)]$

$(1+0.04\times8)-(1+0.04\times4) = \frac{8+k}{k} - \frac{4+k}{k}$

$k=25$

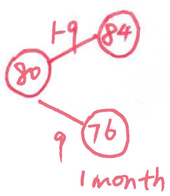
3. $200(1+r)^3 e^{\int_3^6 \delta(t)dt} = 400.$

$r = \sqrt[3]{\frac{8}{7}} - 1 \approx 0.0455$

4. $e^{5r_{ef}} = e^{\int_0^5 \frac{2}{t+1}dt}$

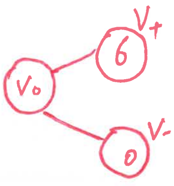
$r_{ef} = \frac{\ln 36}{5} \approx 0.7167$

5.



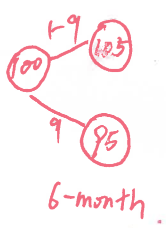
(annual)
$r=8\%.$ $K=78$ (call)

$V_0 = e^{-r\Delta t}\left(\frac{S_+-S_0e^{r\Delta t}}{S_+-S_-}V_- + \left(1-\frac{S_+-S_0e^{r\Delta t}}{S_+-S_-}\right)V_+\right)$



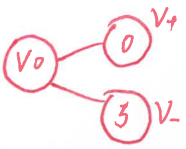
$= e^{-8\%\cdot\frac{1}{12}}\left(\frac{84-80e^{8\%\cdot\frac{1}{12}}}{84-76}\times0 + \left(1-\frac{84-80e^{8\%\cdot\frac{1}{12}}}{84-76}\right)\times6\right)$

≈ 3.39



(annual continuous)
$r=10\%.$ $K=100$ (put)

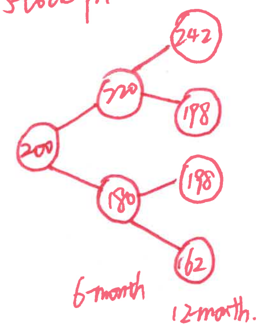
$V_0 = e^{-r\Delta t}\left(\frac{S_+-S_0e^{r\Delta t}}{S_+-S_-}V_- + \left(1-\frac{S_+-S_0e^{r\Delta t}}{S_+-S_-}\right)V_+\right)$



$= e^{-10\%\cdot\frac{1}{2}}\left(\frac{105-100e^{10\%\times\frac{1}{2}}}{105-95}\times5 + \left(1-\frac{105-100e^{10\%\cdot\frac{1}{2}}}{105-95}\right)\times0\right)$

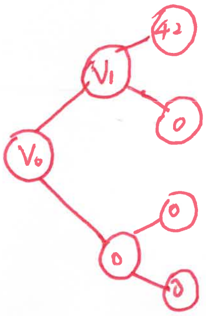
≈ -0.06 no value.

7. Stock price.



$r = 8\%$ (annual continuous).

$K = 200$ (call)



$$V_1 = e^{-5\%\times\frac{1}{2}}\left(\frac{242-220e^{5\%\times\frac{1}{2}}}{242-198}\times 0 + \left(1-\frac{242-220e^{5\%\times\frac{1}{2}}}{242-198}\right)\times 42\right) \approx 25.81$$

$$V_0 = e^{-5\%\times\frac{1}{2}}\left(\frac{220-200e^{5\%\times\frac{1}{2}}}{220-180}\times 0 + \left(1-\frac{220-200e^{5\%\times\frac{1}{2}}}{220-180}\right)\times 25.67\right) \approx 15.86$$