TD5 Pricing and hedging

Exercice 1. Let $S_0 = 100$, $r = 0.05$, $a = -0.1$ and $b = 0.1$.

1. What is the price and the hedging of a call whose the strike $K = 100$.
2. And for the put ?

Exercice 2. We consider a binomial market with two dates 0 and 1, with a riskless asset and a risky asset. The parameters of the model are $r = 0.05$, $S_0 = 100$, $a = -0.1$ and $b = 0.2$.

1. Give the definition of risk neutral probability and calculate this one.
2. Calculate the price of a call and a put with $K = 100$.
3. Check the put-call parity formula.

Exercice 3. We consider a binomial market with three dates 0, 1 and 2, with a riskless asset and a risky asset. The parameters of the model are $r = 0.05$, $S_0 = 100$, $a = -0.05$ and $b = 0.1$.

1. Draw the tree of the risky asset.
2. Calculate the risk neutral probability
3. Calculate the price of a call with $K = 105$ and $T = 2$.
4. Calculate the price of a lookback option whose the payoff is $(S_2^* - 100)^+$ with $S_t^* = \sup_{s \leq t} S_s$.