Part1.R

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CallOption <- function(Stock,tau, Strike, rate, sigma) {  
 d1 <- (log(Stock/Strike) + (rate + sigma^2/2 ) \* tau) / (sigma \* sqrt(tau))  
 d2 <- d1 - sigma\*sqrt(tau)  
 price <- Stock\*pnorm(d1) - Strike \* exp(-rate\*tau)\*pnorm(d2)  
 return(price)  
   
}  
  
PutOption <- function(Stock, tau, Strike, rate, sigma){  
   
 d1 <- (log(Stock/Strike) + (rate + sigma^2/2 ) \* tau) / (sigma \* sqrt(tau))  
 d2 <- d1 - sigma\*sqrt(tau)  
 price <- Strike \* exp(-rate\*tau) \* pnorm(-d2) - Stock\*pnorm(-d1)  
 return(price)  
}  
CallOption(100,30/252,100,5/100,0.2)

## [1] 3.051184

PutOption(100,30/252,100,5/100,0.2)

## [1] 2.457714

PutCallParity <- function(Stock,tau, Strike, rate, sigma) {  
 LHS <- CallOption(Stock,tau, Strike, rate, sigma ) - PutOption(Stock,tau, Strike, rate, sigma )  
 RHS <- Stock - Strike \*exp(-rate\*tau)  
 print(RHS)  
 print(LHS)  
 return(LHS-RHS)  
   
}  
PutCallParity(100,30/252,100,0.05,0.2)

## [1] 0.5934701  
## [1] 0.5934701

## [1] 0