4.) Put option price (premium) = $3
current stock price = $42
strike price = $40

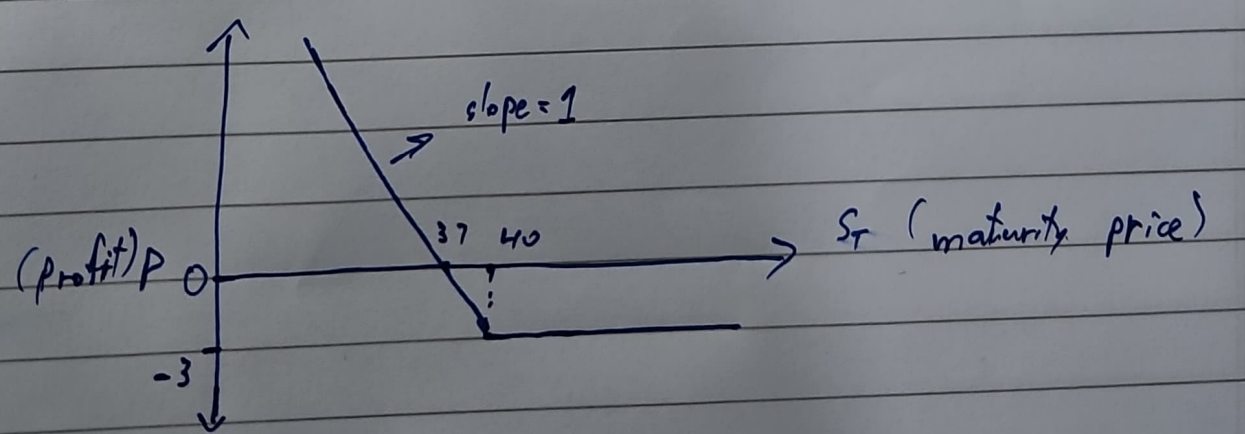
The investor can sell stock at $40 in future if he/she wants
Maturity price -
C-1 >= 40 : won't exercise the option
C-2 < 40 : will exercise the option

P=Profit = max (40 - S_T, 0) - 3
where S_T = price at maturity

a.) S_0,
P >= 0 only when $S_T \leq 37$.

b.) Option will be exercised when $S_T \leq 40$

c.) PnL Plot -



6.) Put-Call Parity Formula

$C - P = S_0 - Ke^{-r_f T}$, C = call price, P = put price, S_0 = current stock price

K = strike price, T = time to maturity, in yrs,

r_f = risk-free rate.

Putting values,

$20 - 5 = 130 - 120\, e^{-r_f \cdot 1}$

$e^{-r_f} = \frac{115}{120}$

$r_f = \ln(120/115)$

So, $r_f = 0.04256 = 4.256\%$