⇒ Valuation of option

1) Theoretical Price

$$= \frac{\text{Expected payoff}}{1+Pir}$$

call ⇒ payoff = spot price − Strike price = SP − X

put ⇒ payoff = strike price − spot price = X − SP

Net payoff = pay off − premium

2) Binomial model :- $\boxed{\text{single}}$

- probability of H·P = $\frac{SP(1+Pir) - LP}{HP - LP}$
- probability of L·P = $1 - {}^{P}H\cdot P$
- Value of call option = $\frac{\text{probability of HP} \times \text{payoff} + \text{probability of L·P} \times \text{payoff}}{1+Pir}$

$\boxed{\text{Double}}$

probability of H·P = $\frac{R-d}{u-d}$

$\left[\begin{array}{l} R = 1+Pir \\ d = (1 - \downarrow \text{decreasing value}) \\ u = (1 + \uparrow \text{increasing value}) \end{array}\right]$

probability of L·P = $1 - {}^{P}H\cdot P$

If increase in prices/decrease in prices given in numbers then to calculate probabilities use formulas, if given in percentage use formulas.

3) Put call parity theory :- All are equal (date, spot, strike)

$V_c = SP - X$

$V_p = X - SP$

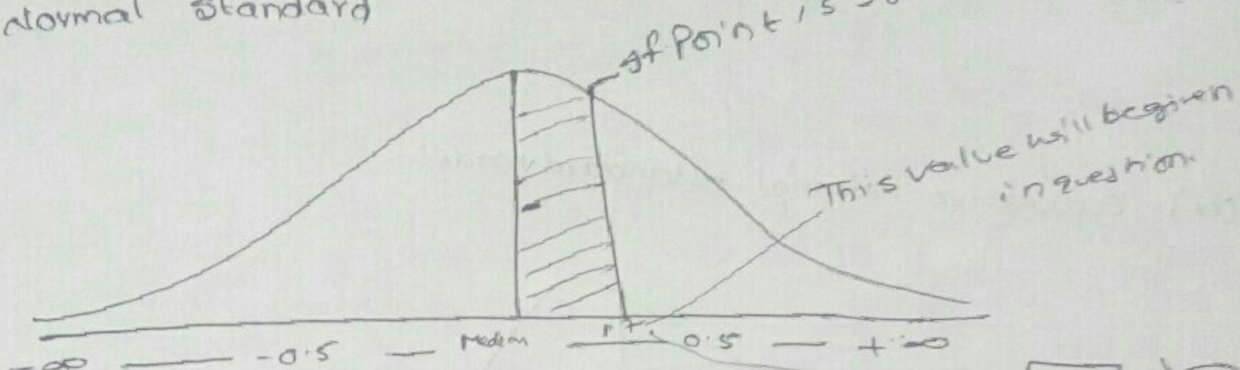
$\boxed{V_c + X = SP + V_P}$

All values will be given but we need to ignore one value & find that value.

See arbitrage & invest.

4) Black -sholes Model :- Z score

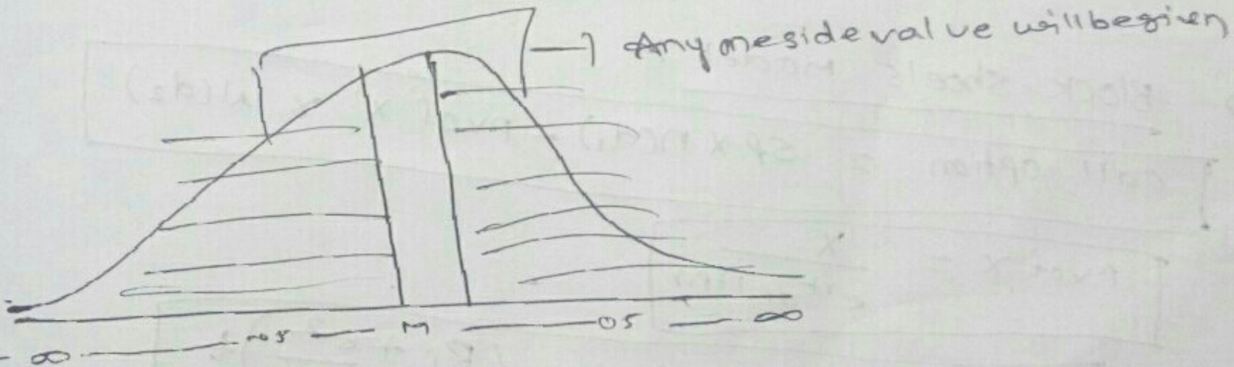
(i) Normal standard



If in question they give normal standard means $\boxed{+0.5}$ to 1.7

$d_1 = 1.7(xxx) + 0.5$

(ii) One tail method :- only any one side value will be given

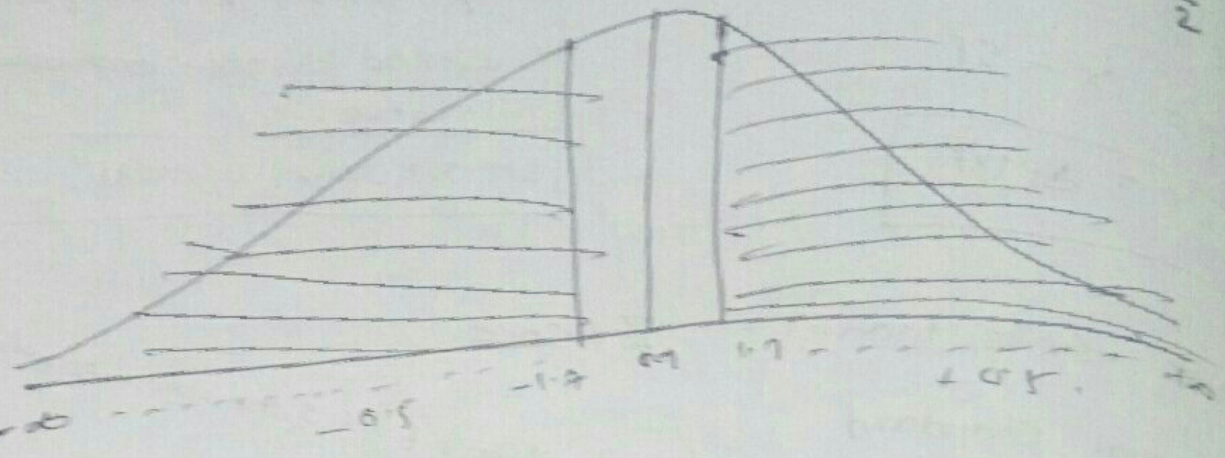


a) If given in -ve (Negative) side then
value of d_1 = Given value

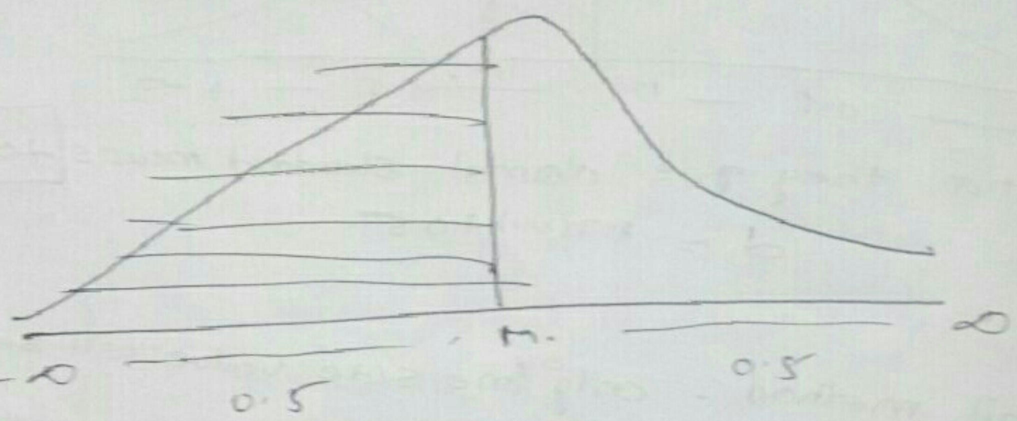
b) If +ve (positive) side given then
value of d_1 = 1 − xxx (given value)

(iii) Two tail : Two sides value will be given then

$d_1 = 1 - \frac{m}{2}$



(iv) cumulative Normal standard model.



⇒ Block Shoels model :-

$$\boxed{\text{Call option} = SP \times N(d_1) - PV \text{ of } 'X' \times N(d_2)}$$

$$\boxed{PV \text{ of } X = \frac{X}{e^{rt} \text{ or } 1+R_f r}}$$

$$\boxed{\begin{aligned} d_1 &= \frac{\ln\left(\frac{SP}{X}\right) + \left(R_f + \frac{\sigma^2}{2}\right)t}{\sigma\sqrt{t}} \\ d_2 &= d_1 - \sigma\sqrt{t}. \end{aligned}}$$

Put option $= [PV \text{ of } 'X' \times N(-d_2)] - [S \times N(-d_1)]$

$N(-d_1) = 1 - N(d_1)$ & $N(-d_2) = 1 - N(d_2)$

) Hedge ratio to minimize the variance of Hedge position.

$$H = P \frac{\sigma s}{\sigma f}.$$

H = hedge ratio, σs = S.D of Δs, σf = S.D of Δf.
P = coefficient corelation of Δs & Δf.

=) Beta for Portfolio of shares = $\dfrac{\text{change in value of portfolio of share}}{\text{change in value of market portfolio}}$

=) formual for Calculating forward price

$$A = P\left(1+\frac{r}{n}\right)^{nt}$$

A = forward price
P = spot price
r = rate of interest
n = no. of compoundings
t = time.