## >> Tapping :-

① Forward ⇒ sum of the distance = L.
② Backward ⇒ sum of the distance = $L_2$
Theoritical distance = L

calculations:-

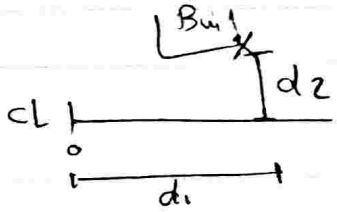
$AB\ avg = (L_1 + L_2)/2$

$Error(e) = |AB\ avg - L|$

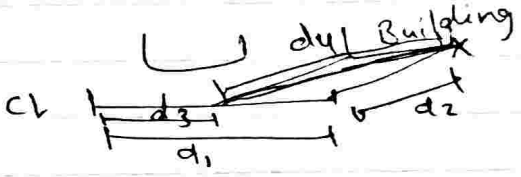
$Rp = 1 / (AB\ Avg / e)$

## >> Mapping :-

* offset Method :-




* ties Method :-




## >> closed Link Leveling :-

- given :- $hBM_1$ , $hBM_2$
- Measure : B.s , I.s , F.s
  بنرتبهم بجدول وبنطلع الـ elevations.
- Checks :-

① * of setup = * T.p + 1
② * B.s = * F.s
③ $\Sigma B.s - \Sigma F.s$ = Ele. L.p − Ele f.p
④ $\Sigma$ Ele all point − Elev. $BM_1$ = $[\Sigma(H.I \cdot (*I.s + *F.s))] - \Sigma I.s - \Sigma F.s$

→ Misclosure Error = h B.m calculated − h B.m Known

→ Tolerance error (mm) = $C\sqrt{K}$ ↳ kilometer

→ correction (ci) = $-\varepsilon \frac{i}{n}$ → * setup using to find the elevation
↳ * setup

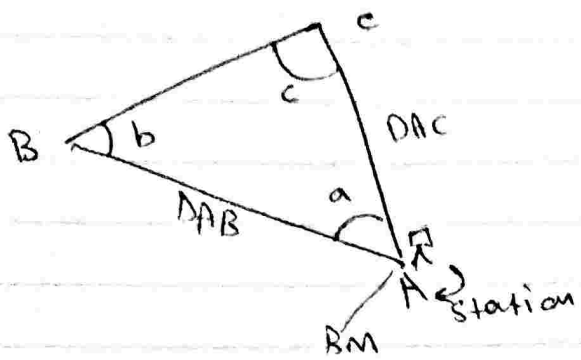
* الفرق لما يكون closed loop إنه بنقارن القيمة المحسوبة للبنش بالقيمة المعروفة
وبكون عنا بنش واحدة

$K = (\Sigma D F.s + \Sigma D B.s)/1000 \Rightarrow D = (r_1 - r_3)/100$
↳ بس بنحسبها لل B.s , F.s

## ⇒ Measuring height of object using Stadia Method:-

→ Known: $H_{B.M}$

→ measured:




$r_1, r_2, r_3$ → to the B.M

$r_1, r_2, r_3$ → point B

HA a

HA b

ZA → BM/A

ZA → P/A

ZA → C/A

H.I at the Station

→ Calculation:-

① $H_{BM} = H_A + H_I + V_{A-BM} - r_{2BM}$

$V_{A-BM} = \frac{1}{2} k r \sin 2(ZA)$ ← B.M

$k$ → 100

$r$ → $(r_1 - r_3)_{BM}$

To calculate $H_A$

② $D_{AB} = k r \sin^2 ZA$

$r$ → $(r_1 - r_3)_B$

$ZA$ → B/A

③ $c = 180° - a - b$

④ $D_{AC} = \frac{\sin(HA\ b)}{\sin C} D_{AB}$

⑤ $V = \frac{D_{AC}}{\tan 2c/A}$

⑥ $h_c = h_A + H_I + V$