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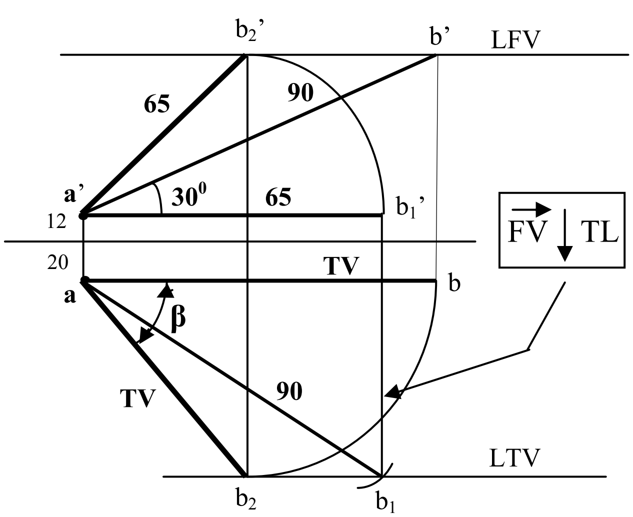
10.17) A line AB 90 mm long is inclined at **30^0** to the **HP**. Its end **A** is **12** mm **above** the **HP** and **20** mm **in front** of the **VP**. Its **front view** measures **65** mm. Draw its projections and find its inclination with the VP.

Ans) Given data:

TL = 90
θ = 30^0
FV = 65
(a', a) = (12, 20);

Logic: Since the TL and FV are given, we can get the projections in the FV. To get the projections in TV, we use the simple rule of drawing the FV parallel to x-y line and projecting it below to cut the TL w.r.t VP.

Steps:
1) Mark (a', a) = (12, 20) from x-y.
2) Draw TL a'b'=90 at **θ** =30^0 and then draw its top view SL ab.
3) Draw LFV on b' and FV a'b_2' with a' as centre and 65 radius. (FV=65).
4) Draw FV =65(a'b_1'), ∥ to x-y at a'. Project it below and cut arc of TL=90 from a to get LTV.
5) On LTV, draw vertical line from b2' to get top view b_2. ab_2 is TV.
6) Measure Φ, α & β.



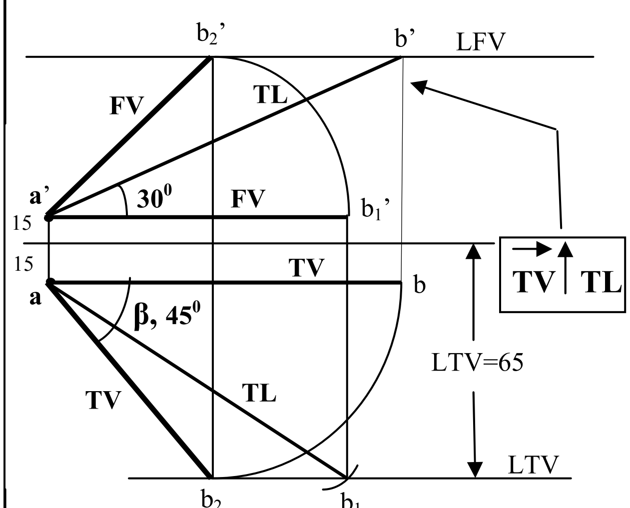
10.15) Incomplete projection of a line inclined at 30^0 to the HP is given in Fig**.** Find the true length of the line and its inclination with the VP.

Ans) Given data:

(p', p) = (15, 15)
θ = 30^0
β = 45^0
LTV = 65.

Logic: Since the TL and Φ are to be found, the given angle in fig is β and the line on it will be TV. Also the LTV is given as 65. Hence TV is found from this. Use the simple rule of drawing the TV parallel to x-y line and projecting it above to cut TL w.r.t HP.

Steps:
1) Mark (p', p) = (15, 15) from x-y.
2) Mark LTV at 65 mm from x-y and draw **β=45^0 from a** to get **TV ab_2.**
3) From **a'**, at **θ** =30^0, draw TL of unknown length.
4) At **a**, draw **TV ∥ to x-y** (ab=ab_2) & **project it above** to cut **θ** =30^0 to get **TL ab'**.
5) Draw LFV at b' & project b_2 to get b_2'. FV =ab_2'.
6) At a, draw TL=a'b' to cut LTV at b1 and measure Φ& α.



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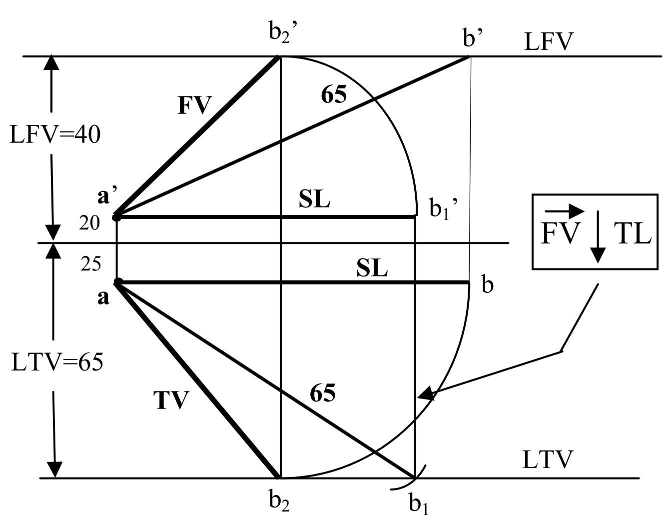
10.12) A line AB 65 mm long has its end **A 20** mm **above HP** and **25** mm **in front** of **VP**. The end B is **40** mm **above HP and 65 mm in front** of the **VP**. Draw its projections and find its inclination with the HP &VP.

Ans) Given data:

TL = 65
(a', a) = (20, 25);
B = (40,65)
⟹ **LFV=40; LTV=65;**

Logic: **End B means here distance of LFV and LTV from x-y. Simply mark the LFV and LTV and then from a' and a, cut arcs of TL = 65 to get the TL above and below.**

Steps:
1) Mark (a', a) = (20, 25) from x-y.
2) Draw parallel lines LFV and LTV at 40 above xy and 65 below xy.
3) With a' as centre and 65 radius cut arc on LFV to get TL a'b'.
4) With a as centre and 65 radius cut arc on LTV to get TL ab_1.
5) At a, draw arc with Radius = SL ab to get TV ab2. Draw vertical line from b2 to get front view b_2'. ab_2' is FV.
6) Measure θ,Φ, α & β.



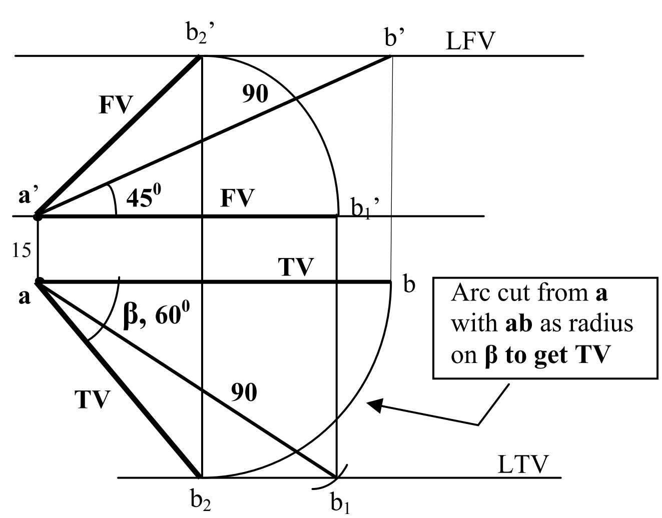
10.14) A **line AB**, **90 mm** long is inclined at $\mathbf{45^0}$ to the **HP** & its **top view** makes an angle of $\mathbf{60^0}$ to the **VP**. The end **A** is **in HP** and **12** mm **in front** of **VP**. Draw its projections & find **Φ**.

Ans) Given data:

(a', a) = (0, 12)
θ = 45^0
β = 60^0(TV angle in VP is β)
TL = 90.

Logic: **Since the TL, θ & β are given, the SL w.r.t VP is found and the same is drawn on line of β to get the TV b_2. On b_2, LTV is drawn and TL cut on the LTV from a. The simple rule is drawing the TV parallel to x-y line at a & cut arc w.r.t VP to get the LTV.**

Steps:
1) Mark (a', a) = (0, 12) from x-y.
2) Draw **TL a'b'=90** at **θ** =30^0, **LFV** at **b'**& draw **SL ab** (ab is TV).
3) From **a**, at **β =60^0**, draw line & cut **arc** of rad = **ab** to get **TV ab_2**.Project **b_2** up on LFV to get **b_2'** and **FV a'b_2'**.
4) At **b_2**, draw **LTV ∥ to x-y& cut arc with rad= 90 to get TL ab_1.**
6) Measure angles Φ& α & length of FV a'b_2'.



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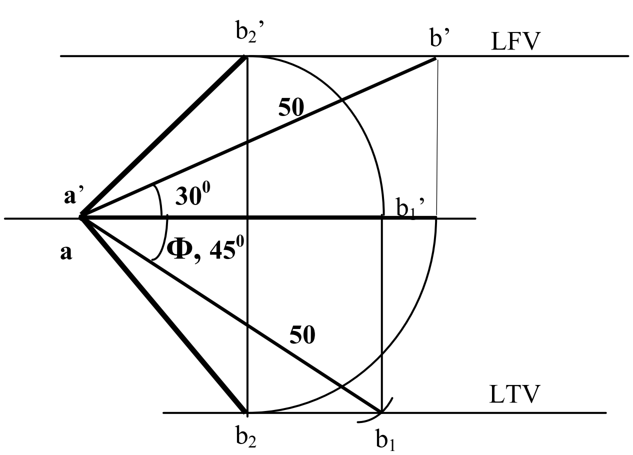
10.8) A line AB 50 mm long is inclined at **30^0** to the **HP & 45^0 to VP.** Its end **A** is both HP & VP. Draw its projections and find its inclinations α & β.

Ans) Given data:

TL	=	**50**
θ	=	**30^0**
Φ	=	**45^0**
(a', a)	=	**(0, 0);**

<u>Logic</u>: Since the TL, θ & Φ are given, we can get the LFV & LTV. Also the SL can be got in each case. To get the projections in TV & FV, we use the simple rule of drawing the SL parallel to x-y line and drawing arcs to cut LFV & LTV.

Steps:
1) Mark (a', a) = (0, 0) from x-y.
2) Draw TL a'b'=50 at **θ** =30^0 and then draw its top view SL ab.
3) Draw TL ab_1=50 at **Φ** =45^0 and then draw its front view SL $a'b_1'$.
4) Draw LFV on b' & LTV on b_1.
5) For **FV**, take rad **<u>$a'b_1'$</u>** with **<u>a'</u>** as centre and cut on LFV to get FV $a'b_2'$.
4) For **TV**, take rad **<u>ab</u>** with **<u>a</u>** as centre and cut arc on LTV to get TV ab.
5) Draw vertical line from b2' to b_2.



10.11) The **top view** of a **75** mm **long line** measures **65** mm and its **front view** measures **50** mm. Its **one end** is **in the HP** and **12** mm in front of VP. Draw its projections and find its inclination with HP and VP.

Ans) Given data:

(a', a)	=	**(0, 12)**
TL	=	**75**
FV	=	**50**
TV	=	**65.**

<u>Logic</u>: Since only lengths are given, α & β are found from the simple rule of drawing the TV parallel to x-y line at a and projecting it above to cut TL w.r.t HP& drawing FV parallel to x-y line at a' and projecting it below to cut TL w.r.t VP.

Steps:
1) Mark (a', a) = (0, 15) from x-y.
2) At **a'**, mark **FV $a'b_1'$= 50 ‖ to x-y & project it below to** cut **TL at ab_1.**
3) At **a**, mark **TV ab=65 ‖ to x-y & project it above to** cut **TL at a'b'.**
4) At **b'**, draw **LFV ‖ to x-y** & at **b**, draw **LTV ‖ to x-y.**
5) Draw **FV** at **a'** with rad=50 & **TV** at **a** with radius =65.
6) Measure θ, Φ, α & β