

PROB:- For a closed traverse ABCD the following bearings were taken by prismatic compass. Correct the bearing for local attraction.

Line	Fore bearing	Back bearing
AB	150°00'	330°30'
BC	285°00'	104°30'
CD	200°00'	20°00'
DA	350°00'	170°00'

Solution:-

Difference of FB & BB of

$$\text{Line CD} = 200^{\circ}00' - 20^{\circ}00' = 180^{\circ}00'$$

It indicates that Station c and D are free from local attraction.

Line	Observed Bearing	Correction	Corrected bearing
AB	150°00'	+0° at A	150°00'
BA	330°30'	-0°30' at B	330°00'
BC	285°00'	-0°30' at B	285°30' 284°30'
CB	104°30'	+0° at C	104°30'
CD	200°00'	+0° at C	200°00'
DC	20°00'	+0° at D	20°00'
DA	350°00'	+0° at D	350°00'
AD	170°00'	+0° at A	170°00'

Line	FB	BB	Diff.
AB	150°00'	330°00'	180°00'
BC	284°30'	104°30'	180°00'
CD	200°00'	20°00'	180°00'
DA	350°00'	170°00'	180°00'

Q. PROB:-

The following bearings were observed in traversing with a compass, an area where local attraction was suspected. Find out the correct bearings and the included angle.

Line	F. B.	B. B.
AB	68° 15'	248° 15'
BC	148° 15'	326° 15'
CD	224° 30'	46° 00'
DE	217° 15'	38° 15'
EA	327° 45'	147° 15'

SOLUTION:-

$$\begin{aligned} \text{For line AB} &= \text{BB} - \text{FB} \\ &= 248^\circ 15' - 68^\circ 15' \\ &= 180^\circ 00' \end{aligned}$$

Therefore station A & B are free from local attraction.

Line	Observed Bearing	Correction	Corrected Bearing
AB	68° 15'	0° at A	68° 15'
BA	248° 15'	+0° at B	248° 15'
BC	148° 15'	+0° at B	148° 15'
CB	326° 15'	+2° at C	328° 15'
CD	224° 30'	+2° at C	226° 30'
DC	46° 00'	+0° 30' at D	46° 30'
DE	217° 15'	+0° 30' at D	217° 45'
ED	38° 15'	-0° 30' at E	37° 45'
EA	327° 45'	-0° 30' at E	327° 15'
AE	147° 15'	+0° at A	147° 15'

Line	FB	BB	Diff
AB	68° 15'	248° 15'	180°
BC	148° 15'	328° 15'	180°
CD	226° 30'	46° 30'	180°
DE	217° 45'	37° 45'	180°
EA	327° 15'	147° 15'	180°

Line	Bearing	Correction	Corrected Bearing
AB	$108^{\circ} 45'$	$+0^{\circ} 45'$ at A	$109^{\circ} 30'$
BA	$289^{\circ} 30'$	0° at B	$289^{\circ} 30'$
BC	$1^{\circ} 00'$	0° at B	$1^{\circ} 00'$
CB	$181^{\circ} 00'$	0° at C	$181^{\circ} 00'$
CD	$303^{\circ} 15'$	0° at C	$303^{\circ} 15'$
DC	$124^{\circ} 30'$	$-1^{\circ} 15'$ at D	$123^{\circ} 15'$
DA	$226^{\circ} 30'$	$-1^{\circ} 15'$ at D	$225^{\circ} 15'$
AD	$44^{\circ} 30'$	$+0^{\circ} 45'$ at A	$45^{\circ} 15'$

PROB

The magnetic bearing of line AB is 279° . The magnetic declination is $7^\circ W$. Find the true bearing.

SOL:-

$$\text{Magnetic bearing of line AB} = 279^\circ$$

$$\text{True bearing of line AB} = \frac{\text{Magnetic bearing of line AB}}{\text{line AB}} - \theta$$

$$= 279^\circ - 7^\circ$$

$$= 272^\circ$$

PROB:- The magnetic bearing of line AB is $S 42^\circ E$. and magnetic declination is $7^\circ 10' E$. Find true bearing of line.

Solution:-

$$\begin{aligned} \text{WCB of line AB} &= 180^\circ - 42^\circ \\ &= 138^\circ \end{aligned}$$

$$\begin{aligned} \text{True bearing of line AB} &= \text{Magnetic bearing of line AB} + \theta \end{aligned}$$

$$\begin{aligned} &= 138^\circ + 7^\circ 10' \\ &= 145^\circ 10' \end{aligned}$$

$$\text{True R.B. of line AB} = \theta$$

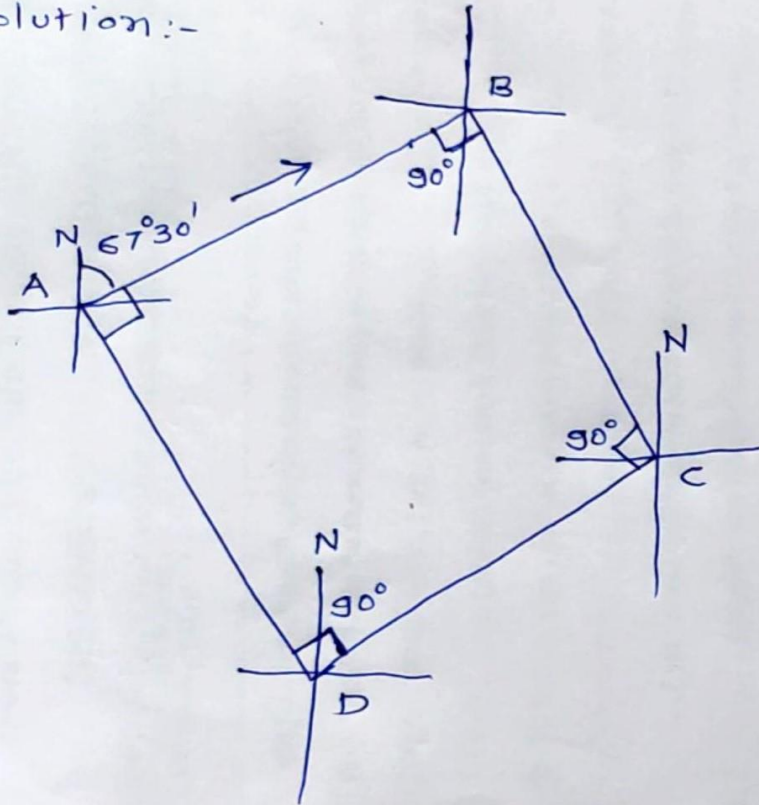
$$\begin{aligned} \theta &= 180^\circ - 145^\circ 10' \\ &= 34^\circ 50' \end{aligned}$$

$$\text{True R.B. of line AB} = S 34^\circ 50' E$$

PROB:-

A traverse ABCDA is made in the form of a rectangle in clockwise direction. If the fore bearing of line AB is $67^{\circ}30'$, find the bearings of other lines.

Solution:-



The traverse is in the form of rectangle. Thus each included angle is 90° .

$$\angle A = \angle B = \angle C = \angle D = 90^{\circ}$$

$$FB \text{ of line } AB = 67^{\circ}30' \text{ (given)}$$

$$BB \text{ of line } AB = 67^{\circ}30' + 180^{\circ} \\ = 247^{\circ}30'$$

$$FB \text{ of line } BC = 247^{\circ}30' - 90^{\circ} \\ = 157^{\circ}30'$$

$$BB \text{ of line } BC = 157^{\circ}30' + 180^{\circ} \\ = 337^{\circ}30'$$

$$FB \text{ of line } CD = 337^{\circ}30' - 90^{\circ} \\ = \cancel{247^{\circ}30'} 247^{\circ}30'$$

$$BB \text{ of line } CD = \cancel{157^{\circ}30' + 180^{\circ}} \\ = \cancel{337^{\circ}30'} \\ = 247^{\circ}30' - 180^{\circ} \\ = 67^{\circ}30'$$

$$FB \text{ of line } DA = 67^{\circ}30' - 90^{\circ} + 360^{\circ} \\ = 337^{\circ}30'$$

$$BB \text{ of line } DA = 337^{\circ}30' - 180^{\circ} \\ = 157^{\circ}30'$$

$$FB \text{ of line } AB = 157^{\circ}30' - 90^{\circ}$$

$$= 67^{\circ}30' \text{ (which is equal to given)}$$

check is performed.

The Included angle of traverse ABCD is as under.

$$\angle A = 104^{\circ} 15'$$

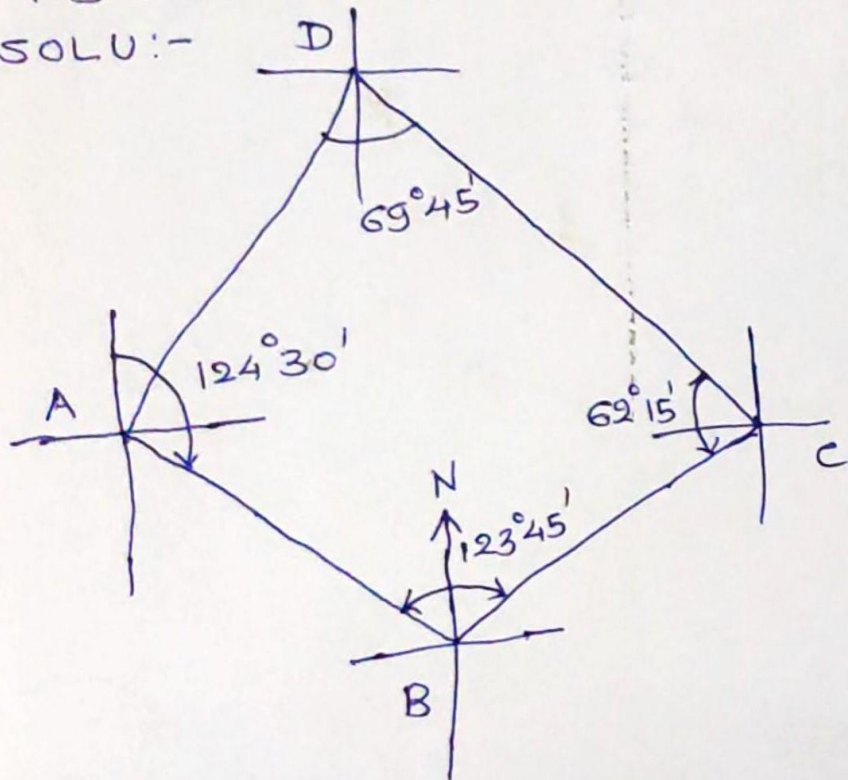
$$\angle B = 123^{\circ} 45'$$

$$\angle C = 62^{\circ} 15'$$

$$\angle D = 69^{\circ} 45'$$

Q If FB of line AB = $124^{\circ} 30'$, Find FB and BB of other lines.

SOLU:-



$$\text{FB of line AB} = 124^{\circ} 30' \text{ (given)}$$

$$\begin{aligned} \text{BB of line AB} &= 124^{\circ} 30' + 180^{\circ} \\ &= 304^{\circ} 30' \end{aligned}$$

$$\begin{aligned} \text{FB of line BC} &= \text{BB of line AB} + \text{Included angle B} \\ &= 304^{\circ} 30' + 123^{\circ} 45' - 360^{\circ} \\ &= 428^{\circ} 15' - 360^{\circ} \\ &= 68^{\circ} 15' \end{aligned}$$

$$\begin{aligned} \text{BB of line BC} &= 68^{\circ} 15' + 180^{\circ} \\ &= 248^{\circ} 15' \end{aligned}$$

$$\begin{aligned} \text{FB of line CD} &= 248^{\circ} 15' + 62^{\circ} 15' \\ &= 310^{\circ} 30' \end{aligned}$$

$$\begin{aligned} \text{BB of line CD} &= 310^{\circ} 30' - 180^{\circ} \\ &= 130^{\circ} 30' \end{aligned}$$

$$\begin{aligned} \text{FB of line DA} &= 130^{\circ} 30' + 69^{\circ} 45' \\ &= 200^{\circ} 15' \end{aligned}$$

$$\begin{aligned} \text{BB of line DA} &= 200^{\circ} 15' - 180^{\circ} \\ &= 20^{\circ} 15' \end{aligned}$$

$$\begin{aligned} \text{FB of line AB} &= 20^{\circ} 15' + 104^{\circ} 15' \\ &= 124^{\circ} 30' \end{aligned}$$

(checked)

