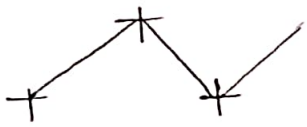
Compass Surveying [2 to 3 (M)]

principle of compass surveying :- ~~Traersewing~~

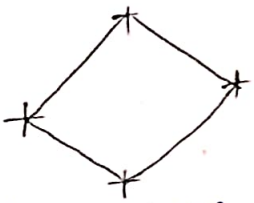
Traversing :→ It is a series of lines connected together to from a network with length & bearings.

Types :→

open traverse :-



closed traverse :-



Note :→ closed traverce is found for finding areas.

Note :→ open traverse is found to check the part of alignmat

Meridian :→ It is a reference line with respect to which the bearing are found.

Types of Meridian :-

1) True Meridian :→ Line joining true North & true south

2) Magnetic Meridian :→ Line joining Magnetic North & Magnetic south

3) Bearing :→ Angle taken with respect to Meridian.

Types of Bearing :-

True Bearing :-

Magnetic Bearing :-

Arbitary Meridian :- It is established for a short period for a temparay cause.

Declination angle :- The horizontal angle b/w true direction & a magnetic direction. (True North & Magnetic North)

Agonic Lines :- It is the line formed by joining all 0° declination point

Isogonic Lines :- It is the line formed by joining equal declination point other than 0°.

Dip Angle :- It is the angle made by magnetic needle of a vertically mounted compass with respective to horizontal line

Aclinic :- line formed by joining 0° dip points

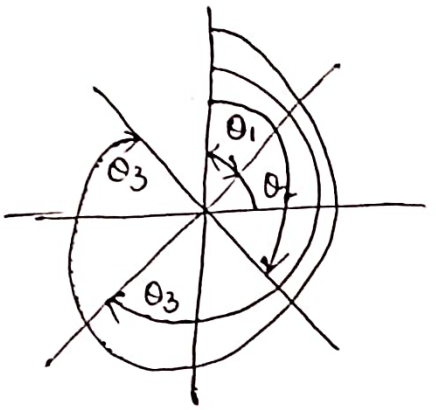
Note :- Equator is an Aclinic line.

Isoclinic line :- line formed by joining equal dips other than 0°

Note :- Aclinic and isoclinic lines poses vertical angles

Bearing.

Whole circle Bearing



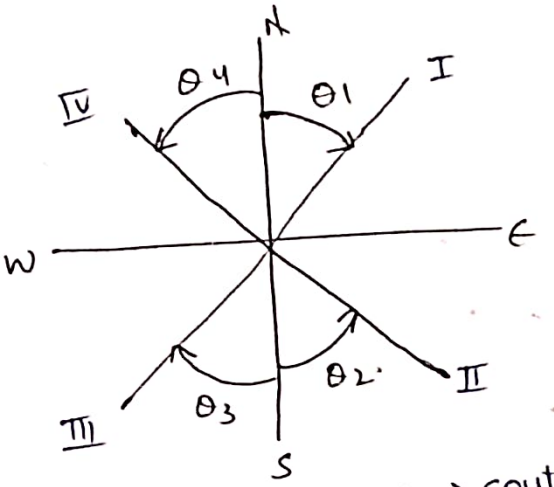
Reference — North

Rotation — clockwise

Representation — $\theta_1, \theta_2, \theta_3, \theta_4$

Angle limit — (0° - 360°)

Reduced Bearing (RB)



Reference — North (or) south

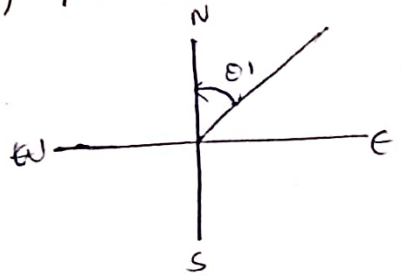
Ratation — C/w (or) A/w

Representation — NO_1E III SO_3W
SO_2E IV NO_4W.

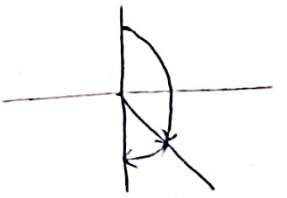
Angle limit — 0° - 90°

1) Convert the following whole circle Bearing to Reduced Bearing

i) 75° 20' 30" = N 75° 20' 30" E

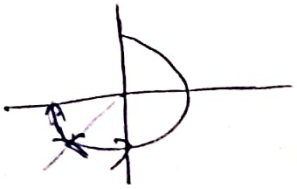


2) 125° 30' 40" = S 54° 29' 20" E



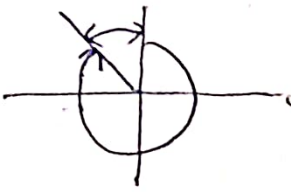
179° 59' 60"
(-) 125 30' 40"
54° 29' 20"

3) 225° 15' 45" = S 45° 15' 45" W



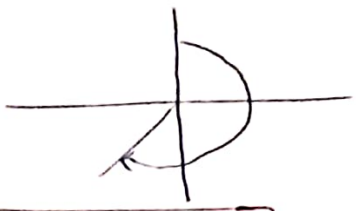
225° 15' 45"
(-) 180 00' 00"
45° 15' 45"

4) 320° 30' 30" = N 39° 29' 30" W



359° 59' 60"
(-) 320° 30' 30"
39° 29' 30"

5) 210° 65' 110" → 211° 06' 50" ⟷ S 31° 06° 50"W



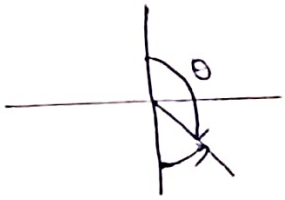
~~210°~~ ~~65'~~ 110"
~~180°~~ ~~00'~~ ~~00"~~
1

211° 06' 50"
(-) 180° 00' 00"
31° 06' 50"

6) 90° — E 90°
7) 180° — S
8) 270° — W 90°

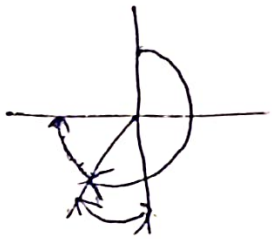
2) Convert RB to WCB

1) S 0° 10' 40" E



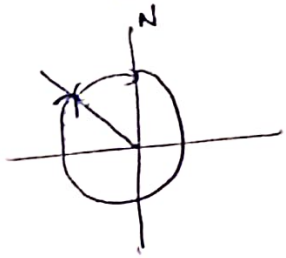
179° 59' 60"
(-) 0° 10' 40"
179° 49' 20"

2) S 50° 0' 30" W



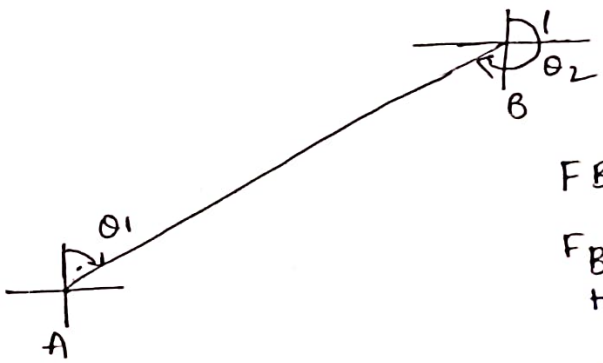
~~180°~~ ~~00°~~ 00"
50° 0° 30"
230° 00' 30"

3) N 59° 120' 10"W
61° 00' 10"



359° 59' 60"
(-) 61 00 10"
298° 59' 50"

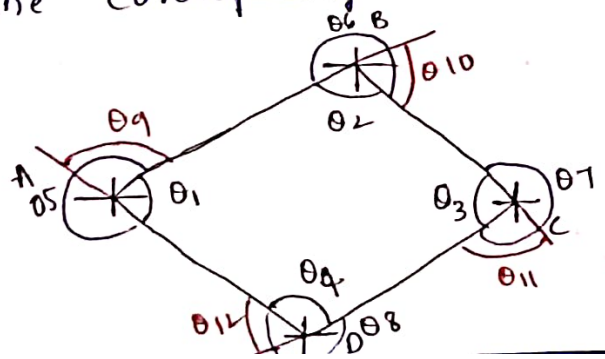
Fore Bearing and Back Bearing :-



$FB_{AB} = \theta_1$ $\quad BB_{AB} = \theta_2$

$FB_{BA} = \theta_2$ $\quad BB_{BA} = \theta_1$

Note :- When local attration is observed then apply correction for the coressponding Bearing



$\theta_1 - \theta_4 \rightarrow$ Interior

$\theta_5 - \theta_8 \rightarrow$ Exterior

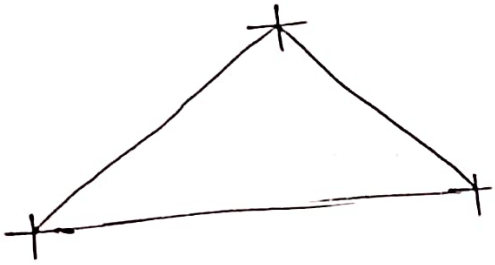
$\theta_9 - \theta_{12} \rightarrow$ Deviation / Deflection

Included Angles :- These angle can be interior (or) exterior depending on the rotation of traverse.

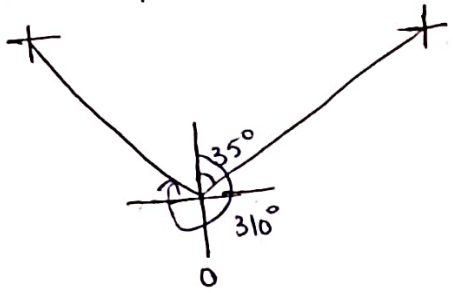
* If the traverse is clockwise, then included angle are exterior angles.

* If the traverse is anti clock wise direction then included angles are interior angles.

Q) The Bearing of AB is 45° and AC is 135° find the included angle for traverse BAC.



Q) Find the included angle for OAB for the given bearings of OA is 35° & OB 310°

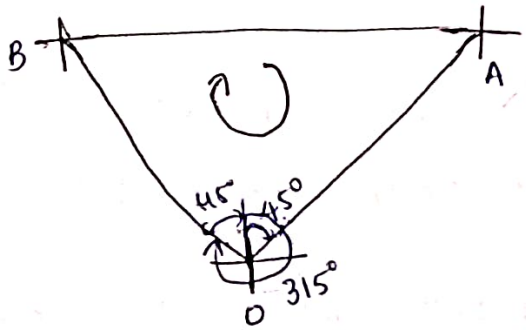


a) 45° b) 60°

c) 65° d) 70°

Data insufficient.

Q) Find the included angle AOB for the given bearings of OA is 46° & OB 316° station O has a local attraction of 1° in Negative-tive positive.



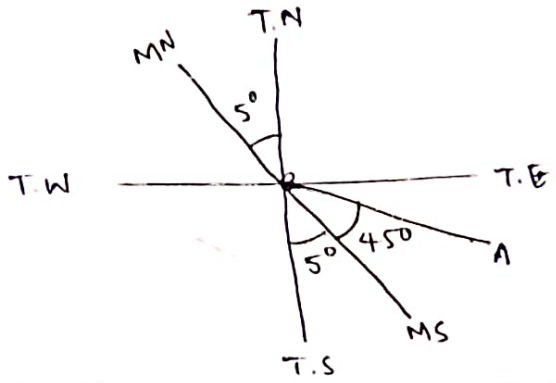
Local attraction +ve

Correction -ve

360
- 90
270°

1) The magnetic Bearing of line AB is S45E, Declination angle is 5°W true Bearing of line AB is.

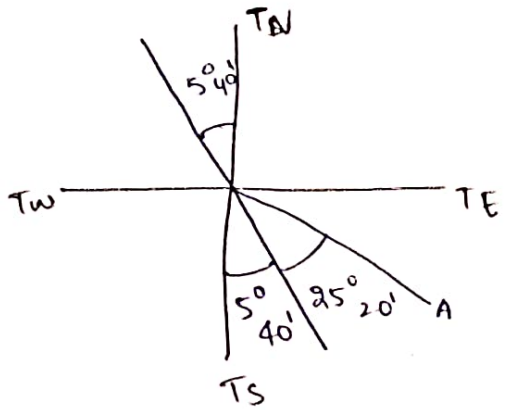
a) S 45° E b) S 40° E c) S 50° E d) S 50° W.



45 + 5 = 50°

S 50° E.

2) If the Dec is 5° 40' W which of the following MB would represent a TB of S 25° 20' E

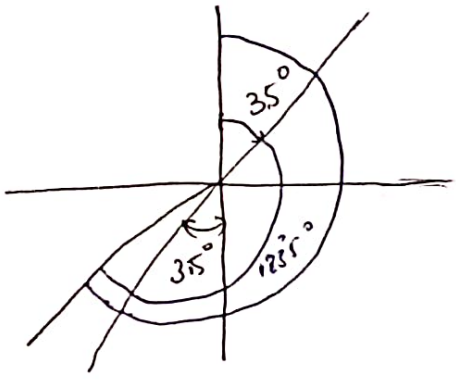


~~24°~~ 80'
5° 40'
~~19°~~ 40'

~~S 19° E~~

S19°40'E

3) The observed M of OE was 185° It was later discovered that station 'O' has a local attration of +1.5° TB of DE considering dec of 3.5°E is ___



183.5+3.5

= 187° //.

M_{OE} = 185° error = +1.5°

correct = −1.5

185
−1.5
183.5

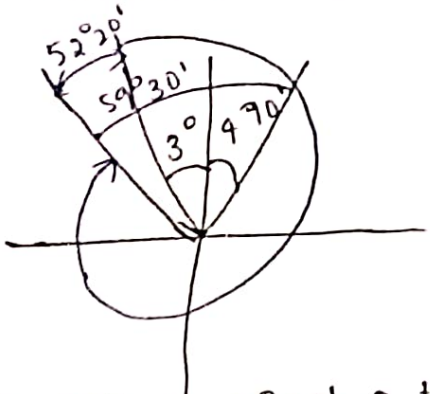
4) The MB_{AB} was N59°30'W in 1967 when the dec was 4°10'E If the present dec is 3°W the WCB of the line @ present is ___

a) 299° 20' b) 307° 40" c) 293° 20' d) 301° 40'

$MB_{AB} = N59°30'W$ $\quad \delta = 3°W$

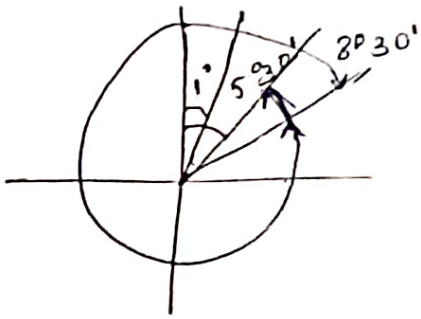
$S = 4°10'E$ $\quad$ WCB @ present

$360 - 52°20' = 307°40'$



In an old map a line RS was down to mB of 5°30' & the dec @ that time is 1°E To what mB should be the line now if the present dec is 8°30'E

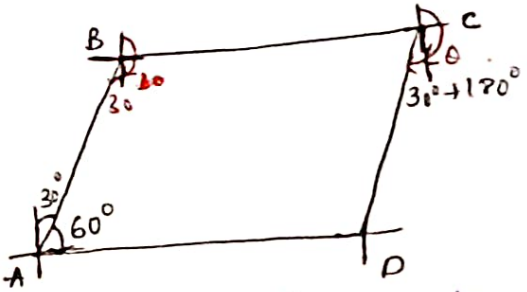
1) 360° b) 13° c) 358° d) 354°



Old map	New map
$m_B = 5°30'$	$m_B = ?$
$\delta = 1°$	$\delta = 8°30'$
$8°30' - 6°30' = 2°00'$	$360° - 2° = 358°$

For a parallelogram piece of land angle BAD is 60° If the Fore Bearing of AB is 30° Bearing of CD is ——

$180 + 30 = 210°$.

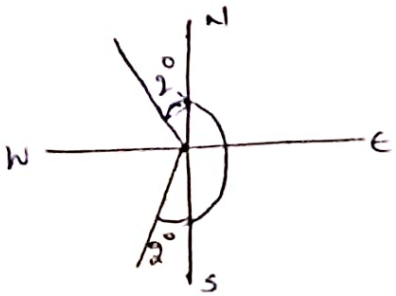


Sun Concept → Start from South move in anticlockwise direction

Ex:- If the magnetic bearing of the sun @ noon is S 2° W then declination is that place is ——.

WCB = 180 + 2

= 2°W.



Correct of Bearings $^{\circ}_{0}$ →

1) Lines | FB | BB

AB | $48^\circ 50' + 1^\circ 10'$ = 50° | $232^\circ - 2^\circ$ = 230°

BC | $130^\circ 50' - 2^\circ$ = $128^\circ 50' + 180$ = $247^\circ 25'$ | $308^\circ 50'$

CD | $67^\circ 25' = 180$

DA | $8^\circ 10' + 180$ = $188^\circ 10'$ | $187^\circ + 1^\circ 10'$ = $188^\circ 10'$

2) AB | $80^\circ 45' + 20'$ = $81^\circ 05'$ | $260^\circ + 1^\circ 05'$

BC | $130^\circ 30' + 1^\circ 05'$ = $311^\circ 35'$ → $311^\circ 35'$

CD | $240^\circ 15'$ | $60^\circ 15' = 180$

DA | $290^\circ 30' - 180$ = $110^\circ 30'$ | $110^\circ 10' + 20'$

Difference b/w Surveyor Compass and prismatic compass

Prismatic compass.

* taking readings, coinciding target happens simultaneous
* Reading are graduated on circular disc which is magnetic
* suspended on pivot

Pivot (Name) → Jewel bearing

WCB → $0^\circ - 360^\circ$

Surveyor Compass

* Happens saperately
* Graduations are on box magnetic needle shows direction
* RB - $(0-90^\circ)$
* suspended on pivot