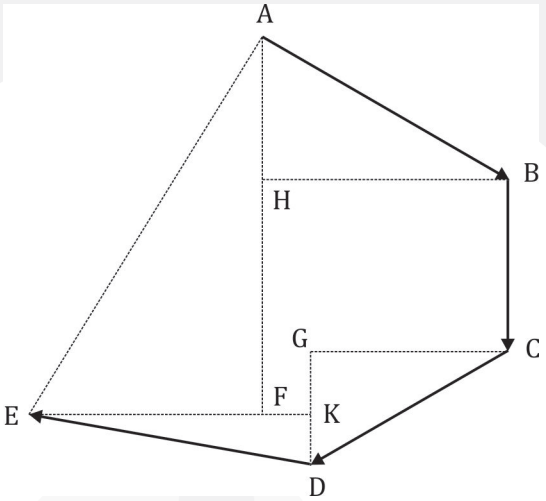
Day's Work

During a day, a number of different courses and distances may be planned for a trip. We can use the traverse table to quickly find difference of latitude and departure of each individual leg, so the total of difference of latitude and departure can be found. These total difference of latitudes and departures are then applied to the initial position to find the final position, or DR position.



The figure above shows AB, BC, CD and DE are the courses and distances, where A is the initial position and E is the final position.

AF is difference of latitude made good from initial position A to final position E, so AF equals the difference of the sum of all difference of latitudes of each leg that are named north, and the sum of all difference of latitudes of each leg that are named south. Difference of latitude AF will be named as the same name with the greatest sum. In this case, all difference of latitudes are named south except DK, which is named north.

$$AF = AH + BC + GD - DK$$

Similarly, EF is the difference of longitude from the initial position A to the final position E. Therefore, EF equals the difference of the sum of all difference of longitudes of each leg that are named west, and the sum of all difference of longitudes of each leg that are named east. In this case, difference of longitude of leg AB is named east, difference of longitude of leg BC is zero, and difference of longitudes of leg CD and DE are named west

$$EF = GC + EK - HB$$

Example 1 Using the above method, find the final position when a ship at position 12°00′N. 110°00′E. steams the following courses and distances:

Course	120°T	180°T	240°T	280°T
Distance	50 miles	30 miles	40 miles	50 miles

Course		Distance	D. Lat.		Departure	
			N	S	E	W
120°T	S60°E	50 miles		25.0	43.3	
180°T	S	30 miles		30.0		
240°T	S60°W	40 miles		20.0		34.6
280°T	N80°W	50 miles	8.7			49.2
			8.7	75.0	43.3	83.8

D. Lat. $= 75.0' - 8.7' = 66.3'(S) = 1°06.3'(S)$

Dep. $= 83.8' - 43.3' = 40.5'$ (W)

Initial Latitude 12°00.0′N Mean Latitude = 11°26.9′N

D. Lat. 1°06.3′(S)

Final Latitude 10°53.7′N

$$\text{D. Long} = \frac{\text{Dep.}}{\cos(\text{Lat}_m)} = \frac{40.5' \text{ (W)}}{\cos 11°26.9'} = 41.3' \text{ (W)}$$

Initial Longitude 110°00.0′E

D. Long. 41.3′(W)

Final Longitude 109°18.7′E

Final position 10°53.7′N 109°18.7′E

If a current is setting, it can be treated as another course with the drift as the distance.

Example 2 A ship at position 30°N 60°W steams the following courses and distances:

Course	150°T	220°T	300°T
Distance	60 miles	30 miles	40 miles

Find the final position if the current is setting 045° with a drift of 12 miles.

Course		Distance	D. Lat		Departure	
			N	S	E	W
150°T	S 30° E	60 miles		52.0	30.0	
220°T	S 40° W	30 miles		23.0		19.3
300°T	N 60° W	40 miles	20.0			34.6
045°T	N 45° E	12 miles	8.5		8.5	
			28.5	75.0	38.5	53.9

D. Lat. $= 75.0' - 28.5' = 46.5'$ (S)

Dep. $= 53.9' - 38.5' = 15.4'$ (W)

Initial Latitude 30°00.0′N Mean Latitude 29°36.8′N

D. Lat. 46.5′(S)

Final Latitude 29°13.5′N

$$\text{D. Long.} = \frac{\text{Dep.}}{\cos(\text{Lat}_m)} = \frac{15.4' \text{ (W)}}{\cos 29°36.8'} = 17.7' \text{ W}$$

Initial Longitude 60°00.0′W

D. Long. 17.7′(W)

Final Longitude 60°17.7′W

Final position 29°13.5′N 060°17.7′W