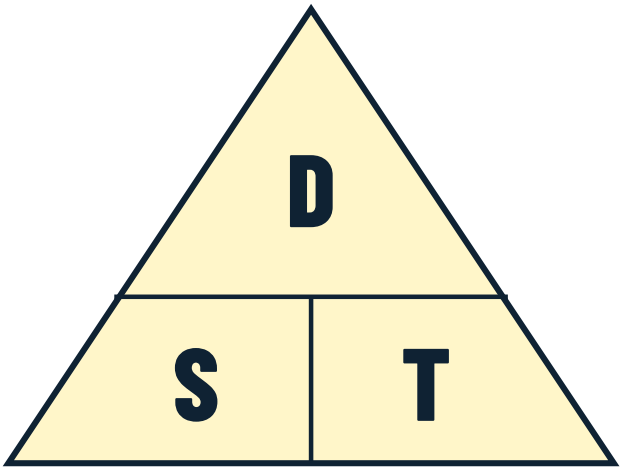
ZULU MARINER DATA CARD

12 CHARTWORK FORMULAS

The numbers every navigator carries in their head.

SPEED, DISTANCE, TIME



Cover the one you want. D = S × T, S = D ÷ T, T = D ÷ S. Time in hours: 6 minutes = 0.1 h, so at 10 knots you go 1 mile in 6 minutes.

> *The 6-minute rule: distance in 6 min = speed ÷ 10.*
> *The 3-minute rule: metres in 3 min = speed × 100.*

COMPASS TO TRUE

T V M D C

True, Variation, Magnetic, Deviation, Compass. **True Virgins Make Dull Companions**. Going down the line (true to compass): add West. Coming up (compass to true): add East.

> *Error West, compass best (compass reads more).*
> *Error East, compass least.*
> *CADET: Compass ADd East to get True.*

FAST ESTIMATES

1 in 60	1° off track ≈ 1 mile off after 60 miles
Distance to the horizon	2.08 × √(height of eye, m) miles
Rising or dipping range	2.08 × (√eye + √light height) miles
Squat (Barrass)	open water ≈ Cb × V^2 ÷ 100 m; double it in a confined channel
Turning	wheel-over well before the course line, more for a big ship
1 minute of latitude	1 nautical mile
Longitude	shrinks with latitude: × cos(lat)

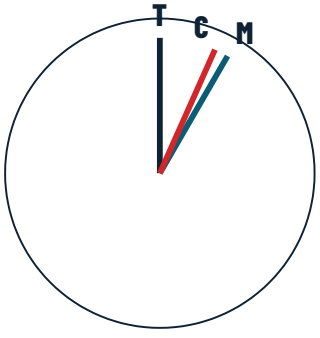
UNITS

1 nautical mile	1,852 m
1 cable	0.1 mile, 185 m
1 knot	1 mile an hour, 1.852 km/h
1 fathom	6 feet, 1.83 m
1 m	3.28 feet

FIXES

- Cross bearings: two objects about 90° apart, or three about 60° apart. Three make a cocked hat.
- Take bearings ahead and astern first, abeam last (abeam changes fastest).
- Always check GPS against a bearing, a range or the depth.

A WORKED EXAMPLE



True, magnetic and compass north. Angles drawn ×3.

True	090°	
Variation	10° E	− East
Magnetic	080°	
Deviation	2° W	+ West
Compass	082°	

True to Compass: east is least (subtract), west is best (add).

Compass to True: the other way round.

Study aid only. Not for navigation.
Check the current official rules. Card 12 · v1.7 · © Nautical Bridge