

Celestial Navigation

The goal of celestial navigation is to find your position on the Earth (your latitude and longitude).

A) FINDING YOUR LATITUDE: You need a sextant³

You should be able to say **VERY QUICKLY** how you find your latitude from the stars, particularly in the northern hemisphere.

B) FINDING YOUR LONGITUDE: You need a sextant, a clock, and an ephemeris¹⁰

An ephemeris will allow you to find out the difference in longitude (time zone) of your clock, and your current longitude, using the same logic as you did for finding the difference between solar noon and civil noon for various locations. Look up the location on Google Earth or some other program ... you can use [Google Maps](https://support.google.com/maps/answer/18539?co=GENIE.Platform%3DDesktop&hl=en).

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DETERMINE YOUR POSITION FROM THE FOLLOWING DATA:

- a) With your sextant you sight Polaris at an altitude of 19.25° above your northern horizon.
- b) You observe the transit of Sirius at 12:26 AM on January 1, according to a clock set for New York.
- c) You look up the transit time of Sirius on January 1 on p. 13 of the battered old *Field Guide to the Stars and Planets* that you've carried since your astronomy days at St. Lawrence, and use it to figure out your position east or west of $75^\circ W$ (the center of the Eastern Time Zone).¹⁰

WHERE ARE YOU? SHOW THE STEPS FOR FIGURING IT OUT SO YOU WILL BE ABLE TO DO IT AGAIN!

-- How far do you have to go to get be able to land the boat?³

Polaris at altitude of $19^\circ 30'$ \Rightarrow Latitude = $19^\circ 30'$ N

Sirius should transit at midnight EST on January 1

Observed to transit at 12:26 am \Rightarrow 26 minutes late

$$26 \text{ minutes} \times \frac{1 \text{ degree}}{4 \text{ minutes}} = 6.5 \text{ degrees}$$

Late \Rightarrow west of time zone center ($75^\circ W$)

longitude = $75^\circ + 6.5^\circ = 81.5^\circ W = 81^\circ 30' W$

7.5 miles WSW from George Town!

We're in the Cayman Islands!

