

TSC Navigation Challenge

You and your crew left Las Cocinas anchorage around 9 pm on Wednesday night, headed for Santa Rosalia. The night was clear with just a tinge of Autumn in the air. The seas were fairly calm and the wind was between 10-15 knots. The stars were very bright and plentiful, so you pushed back the bimini to take in the wonderful night sky. You and your crew stuck to a 3 hour watch and so were fairly well rested when the sun came up around 6 am.

As you were brewing your morning coffee, you noticed that the GPS was not turned on. No problem – an easy fix, just push the button. But that little button would not work. Ah, but again, no problem, you have plenty of batteries...Oops, the GPS still does not turn on. As you shake the GPS to try to bring it to life, you notice that water starts spilling out and realize that there is no hope of the GPS working in the near future.

Well, now you're in the middle of the Sea of Cortez, hoping to have a good dinner in Santa Rosalia. How do you get there? The air is dry so you can see pretty far into the distance. The northern tip of Isla San Pedro Nolasco is to your port and the northern tip of Isla Tortuga is in front of you. Fortunately, you had the good sense to stow your hand-held compass in a safe, dry place. So you pull out the compass and take compass bearings on these two islands:

Isla San Pedro – 66 degrees magnetic

Isla Tortuga – 151 degrees magnetic

The challenge – How far is Santa Rosalia and what heading (magnetic) do you take to get there, assuming the wind is perfect for a direct sail?

The Answer is

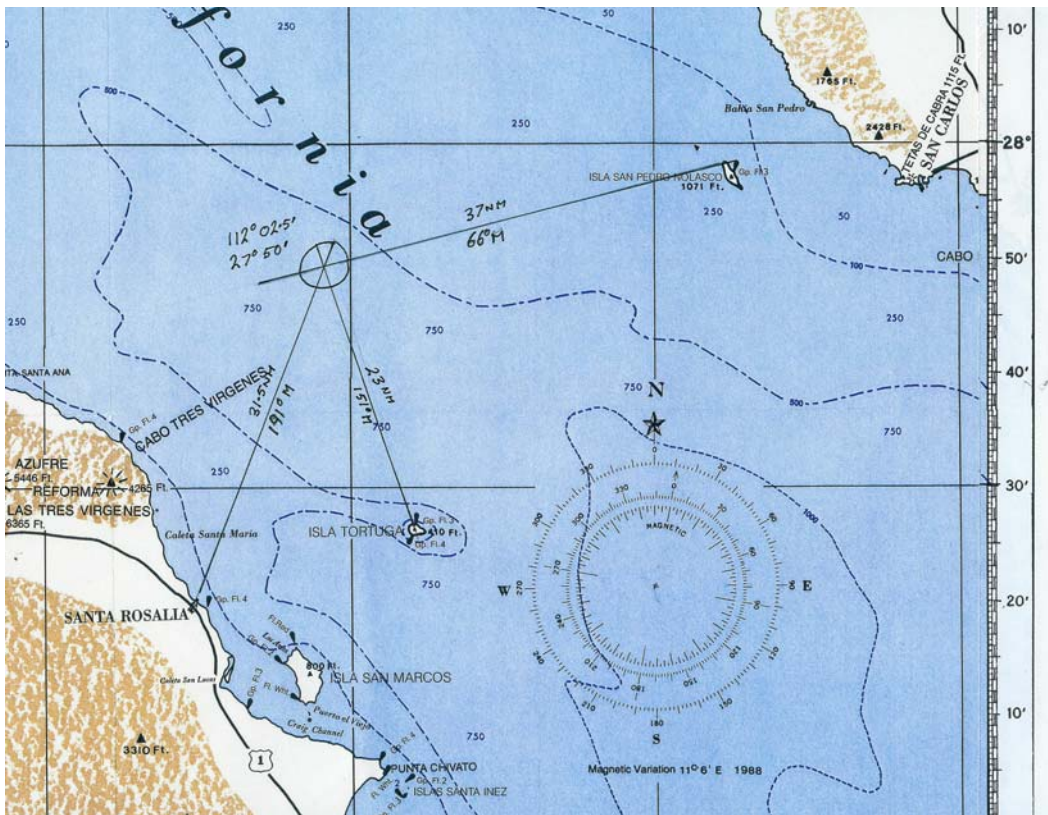
Distance 31.5 NM Heading 191° Magnetic

How did we come up with that??

Note: Now Annual Variation is given so the Magnetic Compass rose can be used with on other calculations needed.

Also it is stated that the bearings were taken using a hand held compass so no deviation needs to be calculated.

Look at the chart on the next page.



Drawing the LOP's

Use your parallel ruler and the compass rose on the chart (use the inner magnetic rose)

Place one edge of the ruler so it passes through the center of the rose and 066° on the magnetic scale. Now, walk the ruler to the north end of San Pedro Island and draw a line back towards your estimated position.

Use the same method to draw a line from Isla Tortuga (bearing 151°)

Your position is where the two lines cross. Label this with a circle. Label the two bearing lines with the direction.

Now you know where you are.

Fine the bearing and distance to Santa Rosalia.

Place one edge of the ruler so it passes the center of the circle and the entrance to Santa Rosalia. Draw a line between the two. Walk the ruler to the compass rose (remember to use the magnetic rose) and read of the direction (191°)

Label the LOP with this bearing.

Next find the distance to Santa Rosalia.

Using a pair of dividers, place one end on you position and the other end on your destination. Without changing this setting, move the dividers to the latitude scale on right side of the chart near the midpoint of the latitudes of your points.

Place one leg of the dividers on the minute or degree mark, in this case use the 20' mark. Place the other leg of the dividers on the on the latitude scale, now count the minutes and tenths of minutes between the two points. Remember one minute of latitude equals one nautical mile. (31.5nm) That's it, just label the LOP's with bearing and distance as shown above. Typically you should label the LOP's with the time, but we were not given this information.

Typical chart compass rose. Note the magnetic Variation in this area is 11° 6' E
 Some charts also have the annual Variation listed.

To convert from Magnetic to True (outer ring of the rose) Bearing – Variation
 (66° - 11° = 55°)

