DISTANCE TO HORIZON CALCULATIONS

This is how to calculate distance to a known object on the horizon. Also included are two 'rules of thumb' for making this calculation.

Often, you want to calculate the 'distance off' from the horizon. There are tables to calculate this in many books such a Bowditch. However, here is a very simple formula and example of how to quickly calculate this.

You need to know the height of your eye from the water line. So:

1. Distance from water to your feet – eg maybe 5 feet
2. Your height – 6 feet
3. Total = 11 feet

Formula: 1.169 times the square root of height of your eye = distance to horizon in nautical miles (nm)
1.169 times $\sqrt{11}$ = 1.169 times 3.317 = 3.878 nm

Often you see a reference on a chart or in a sailing guide book to an object such as a light or a tower and wondered 'when will I see that on the horizon?'.

If you take the height shown (eg 95 feet) and work the above formula, the object will be visible 11.394 nm offshore. [1.169 times $\sqrt{95}$ = 11.394]

However, that assumes your eye is at the waterline. In fact, you will likely be standing on board. First you calculate the distance the object will become visible. Then you calculate your distance to the horizon. Finally, you add these two distances together.

1. Tower height: 95 feet
2. Distance to horizon: (1.169 x $\sqrt{95}$) = 11.394 nm
3. Your distance to horizon: (1.169 x $\sqrt{11}$) = 3.878 nm
4. Distance when tower becomes visible to **you**: 11.394+3.878 = 15.27 nm

As each person's height varies, all distance off calculations done by www.great-lakes-sailing.com are based **only** on the height of the object. Therefore, there is a margin built in for you.

45/90 Bearing Method

Note in your log your position when an object onshore is 45 degrees off your bow.
When that object is abeam (90 degrees to your bow), it is the same distance off as the distance you have covered since the 45 degree bearing.

Double Bow Angle Method

Note in your log your position when an object is 25 degrees or more off your bow.
Note the angle and watch your compass carefully until the object is exactly double that initial angle.
Your distance off at the 2nd bearing is the same as the distance run between the bearings.