**2.6 Worksheet Solution: Extrapolating position with distance and bearing**

Problem:

Let us assume that the ice will keep moving at the same speed and in the same direction as it did over the last day. Where will the ice drift to in a day’s time?

Assume the ice will keep drifting with the same bearing and speed of the previous day. Calculate the meridional and zonal distance it will travel.

From these two distances find the number of degrees latitude and degrees longitude the ice moved.

Add these to the start position to estimate where the ice will be in one day.

Points for discussion

How accurate do you think your forecast is?

How will you test this?

Let’s see tomorrow where the buoy moved to.

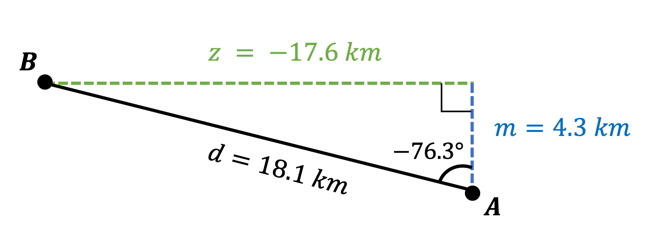
Worked Example Solution:

* This is a reverse calculation to estimating bearing and direction in the previous exercise.

*This example will again use data from Buoy ID: 300234060834110. We will consider the drift over a 2-day period:*

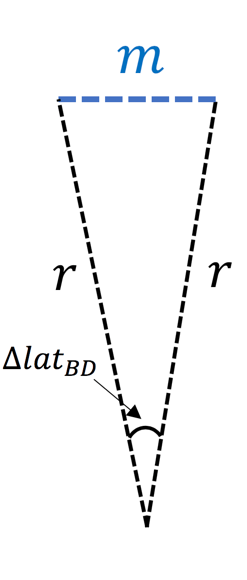
* *Point A: () on Oct 27, 2016*
* *Point B: () on Oct 28, 2016*
* *Point D: () on Oct 29, 2016*

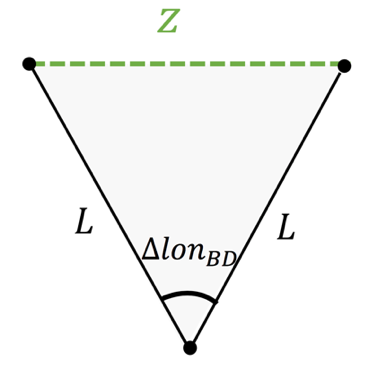
From worksheet (2.5-solution), we found the drift distance and direction of the buoy from point A to point B as shown in the following figure:

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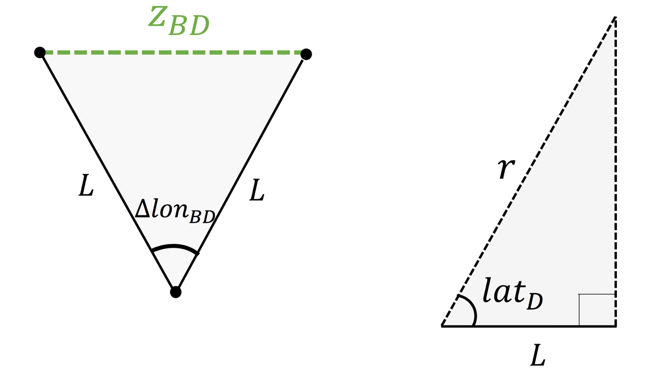
We’ll assume the buoy will drift the same way it did that day over the following day. So, we’ll assume the buoy will again drift at an angle West of North. Knowing the coordinates of the buoy at location B, we’ll use this information to calculate the coordinates of the buoy at location d.

Distances *m* and *z* will be the same as they previously were, so we can use this information to calculate the new latitude coordinate, .

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* Be careful that your calculation of is returning a value in degrees and not in radians, otherwise this will give an incorrect answer.

We can use the same rule to calculate for the triangle containing :

We will need to calculate using right triangle geometry:

Plugging this in, we find:

The forecasted coordinates of point D are: ().

Students can compare to the actual recorded position: *()*

A handy online tool to compare two geographic locations on a map is

<http://dwtkns.com/pointplotter/>