

Bearings

Year 9 Mathematics
Mainstream

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Learning Objectives

By the end of the lesson I hope that you understand and can apply the following to a range of questions from the Year 9 Mathematics course.

- Know what a bearing is
- Know how to write a bearing
- Know how to draw a bearing diagram
- Know what a true bearing is
- Know the co-interior angle rule to find a missing angle in a bearing question
- Know how to use trigonometry to find distances in a bearings question

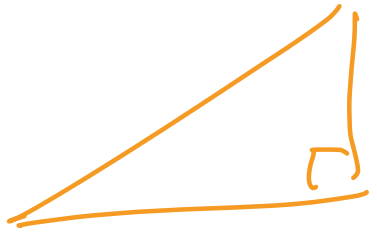


RECAP

This is building on the work we have been doing in Trigonometry. We are now going to look at the important topic of bearings. This is a way of expressing a journey using an angle (referenced to North) and a distance.

SOH CAH TOA

$c^2 = a^2 + b^2$





What is a bearing?

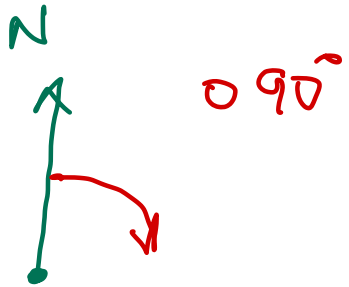
A bearing is a way to describe a journey.

Most journeys have a distance and direction travelled.

We might say we have travelled 10km due North. This is an example of a bearing. It's not written in a nice way though! This isn't English … so we need a Mathematical way of writing one down.

Two things to know about bearings:

1. **They are always referenced from a North line (pointing North!)**
2. **The angle is always measured clockwise**
3. **The angle is always give with three digits**
4. **We use a capital 'T' to denote we are facing North and then turning**





True North and Bearings

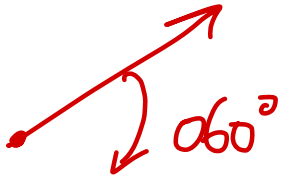
We can measure bearings starting from any point really but it's normal to reference everything to **North**. In every drawing you will be expected to draw one **or more** North lines.

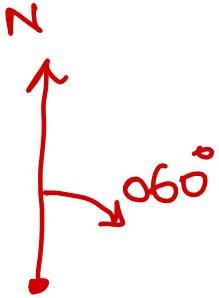
Doing this makes the calculations make much more sense.

When we take a bearing from North we state we are taking it from True North.

We can express this as T090°

The 'T' means we are starting our rotation by pointing North first.





T060°



Bearings always have three digits

Bearings always have three digits.

We can turn from 0° to 359° (assuming we're only turning by whole degrees).

Examples of bearings could be:

- T004°
- T075°
- T100°
- T270°

Notice that they all have three digits.

Each one of these bearings start by facing North and then turning the number of degrees shown in a clockwise direction



Never Eat Shredded Wheat

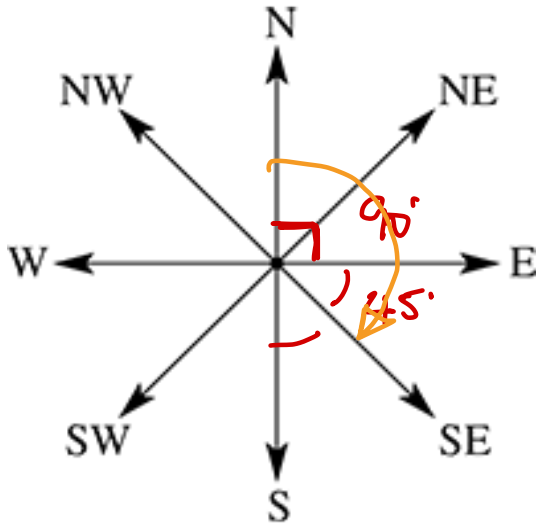
Or … **Never Eat Soggy Weetbix**

It's important to know the compass directions too when doing bearings questions!

Questions will make reference to compass directions too and ask you to write them in terms of a bearing.

So, for example, **East** would be T090°

And, South East would be T135°.





Example of stating a true bearing

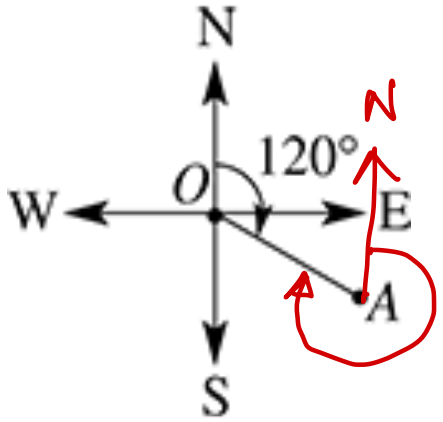
For the diagram shown give:

a) The true bearing of A **from** O

b) The true bearing of O **from** A

Note: The very important word here is **FROM**. This tells you where you are standing and from where you will turn.

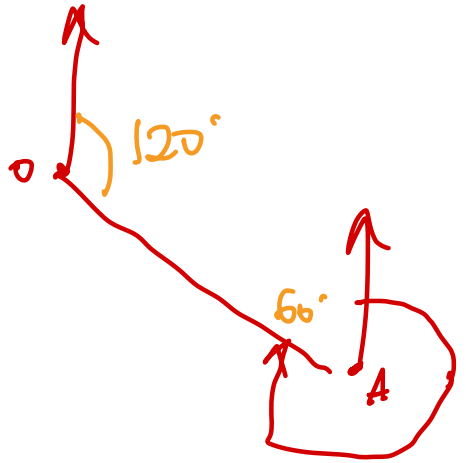
You are looking at saying, for example, if I stand at O, how many degrees clockwise would I turn before I was facing A.



a) T120°

b) 360° − 60

= T300°



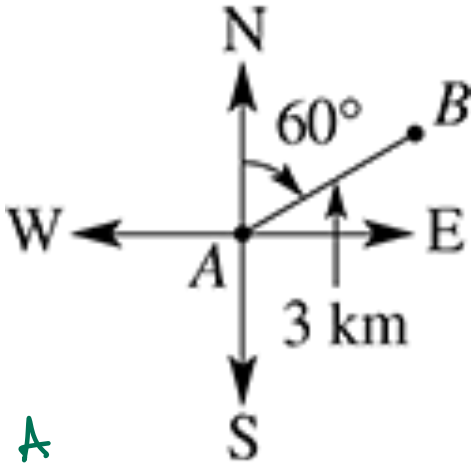


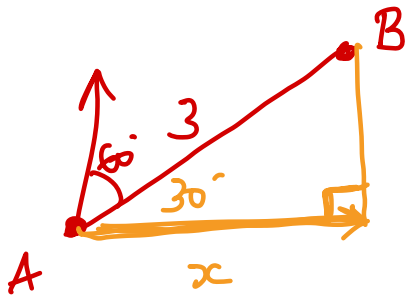
When we have lines and angles, we have trigonometry

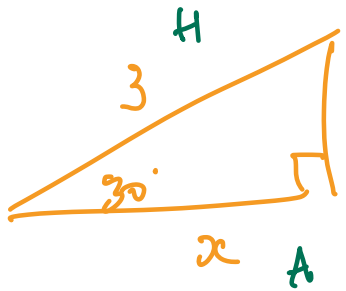
It's important to note that any line which comes at an angle can be turned into a right angled triangle. When this happens we can use Trigonometry!

Example: A bushwalker walks 3 km on a true bearing of 060° from point A to point B. Find how far east (correct to one decimal place) point B is from point A.

Remember. Find the right angled triangle!







$\cos\theta = \frac{A}{H}$

$\cos 30° = \frac{x}{3}$

$x = \cos(30) \times 3$

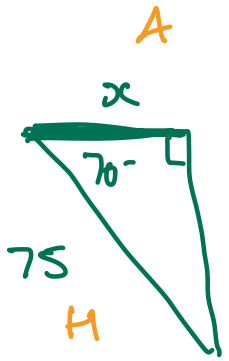
$= 2.6$ km



Calculating a bearing

A fishing boat starts from point O and sails 75 km on a bearing of 160° T to point B.

a) How far east (to the nearest kilometre) of its starting point is the boat?
b) What is the true bearing of O **from** B?

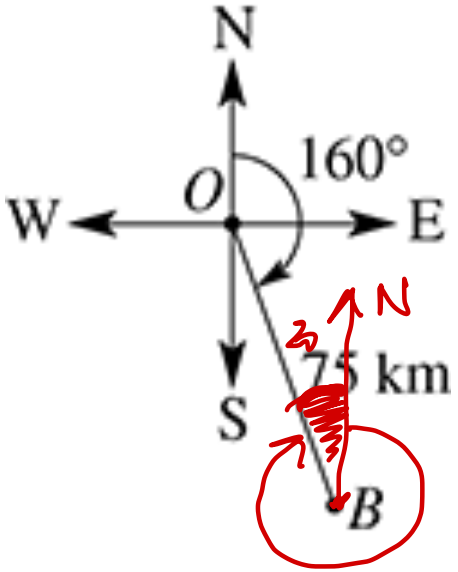


$$\cos\theta = \frac{A}{H}$$

$$\cos 70° = \frac{x}{75}$$

$$x = \cos(70°) \times 75$$

$$= 26 \text{ km}$$





Bearing = 360° − 20°

= T340°



Questions to complete:

The questions I would like you to complete for this lesson are:

Exercise 3J Bearings
Questions: 2, 3, 5, 8, 9, 11, 13

Extension: 14





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