

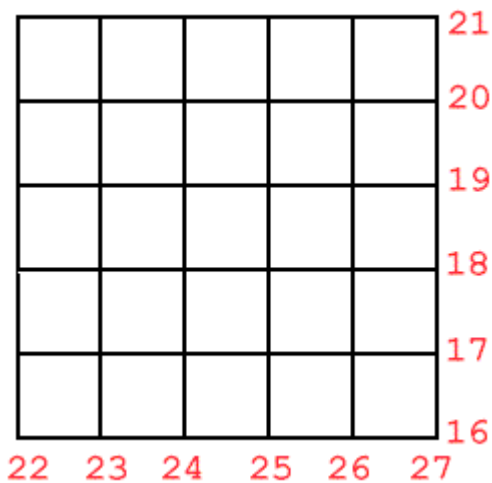
Navigation

Map reading is part art and part skill. The art comes from practice and the skill from following a few simple rules. Here BGMA will take a step-by-step look at how to become a good (dare we say, skilled) map reader.

A good place to start is with Grid Coordinates. Forget the squiggly lines and the colours and the little PC symbols for a moment and take a step back and look at the wonderful thing called the OSGB or Ordnance Survey Grid Reference.

A question. Take a map and remove the actual map and what are you left with?

Answer - a grid. Here is a simple example:



Notice the numbers across the bottom and along the side.

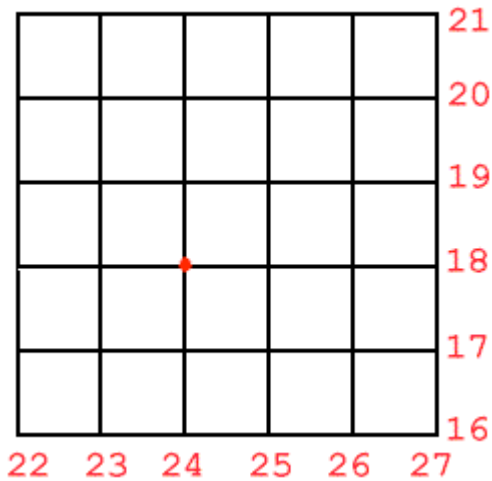
- Going left to right you have the EASTINGS (so called because they increase as you go east)
- Bottom to top you have the NORTHINGS (so called because they increase as you go North)

Burn these concepts into your mind. They are important and you'll be using them over and over again. Why?

Because eastings and northings allow you to uniquely reference anywhere on an OS map. Here's how.

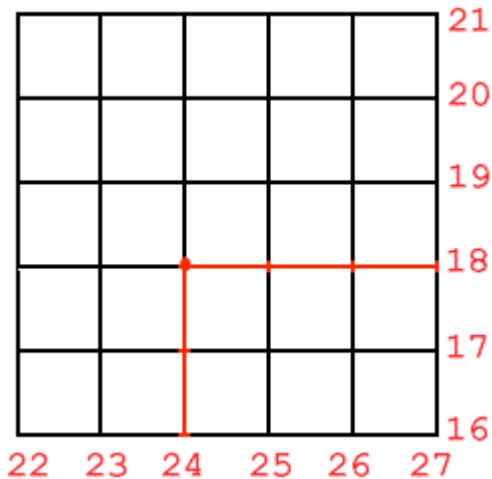
Navigation

Take the red spot on the map:



Where is this red spot?

Well, we can give its position using the eastings/northings system easily. The spot lies on easting number 24 and northing number 18:



So we can give it's position as:

Easting: 24

Northing: 18

Now, that's good but clumsy, so what we can clean it up a bit and join the eastings and northings together, separated only by a space:

24 18

Navigation

That is what is known as a 4-figure grid reference. Two digits for the easting and two for the northing.

What order do they go in?

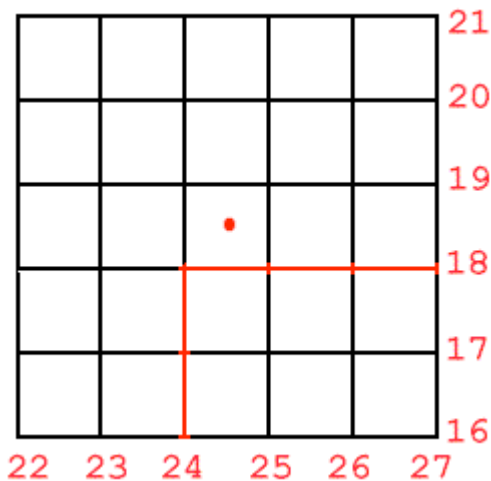
Always remember that eastings go first, followed by northings. A simple way to remember it is with the phrase:

"Along the corridor and up the stairs"

This translates into:

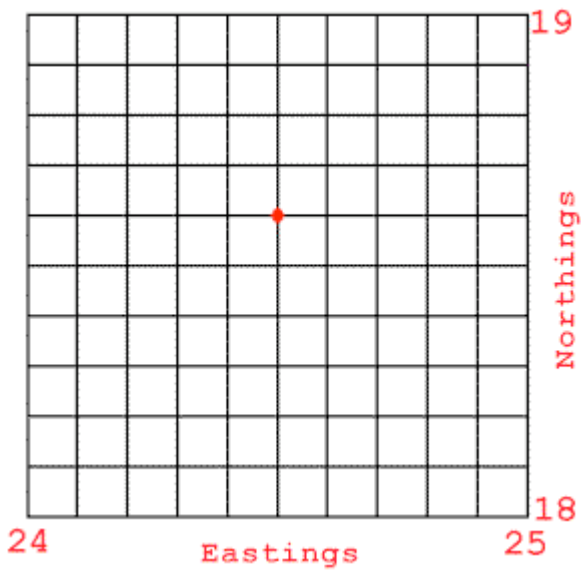
"Read along the bottom of the map then up along the side"

But what is the point you want to reference isn't conveniently on the easting/northing? What if it is something like this:

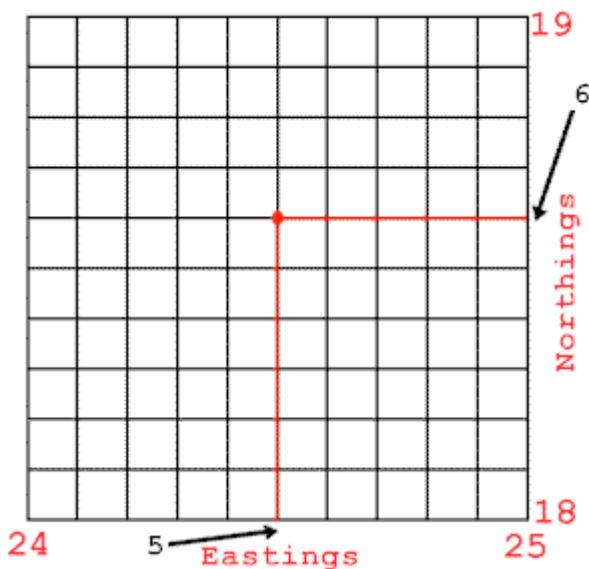


Now you don't have the benefit of the easting and northing lines to help you. What you now have to do is mentally divide up the square that the point you want to locate is in into smaller bits. In fact, into 10 both ways like this. This can be made easier if you use the ROAMER scale on the top of a compass (Silva Exped 4) :

Navigation



With these divisions in place, read the new grid left to right, bottom to top once again and add the new numbers to the existing easting and northings:



The eastings now read 24 and 5, giving 245

The northings now read 18 and 6, giving 186

Note that the new number is placed at the end of the existing numbers, not added to the number - adding the numbers together is a common mistake make be newcomers to navigation!

The grid reference now reads:

245 186

Navigation

Now you have a six digit grid reference for the red dot on the map.

Can you have more than six digits in a grid reference?

Yes, eight- and ten- digits are common but we'll come to them in a later articles.

There you have it - a simple introduction to grid references. During the Intermediate/Advanced section we'll take a deeper look at grid references and see how they fit in with Ordnance Survey maps. We'll also be looking at real grid references in action!

BGMA's TIPS!

- *Overlaid over the actual terrain map is a grid*
- *This grid comprises of easting and northings*
- *Easting go left to right along the map*
- *Northings go bottom to top*
- *Remember - "**Along the corridor and up the stairs**"*
- *When giving a grid reference you read the eastings first then the northings*
- *When sub dividing a grid, place the new number obtained at the end of the existing figure, don't add them together*

Grid References Intermediate/Advanced

A full reference that uniquely identifies an area anywhere in the UK consists of two letters followed by either six, eight or ten digits giving resolution to 100 metres for six digit grid references (SH 805 309), 10 metre resolution for an eight digit grid reference and 1 meter for a 10 digit grid reference. The two letters are used to indicate the 100 km by 100 km square in which the point lies and can be omitted - remember though, without it, your grid reference is not unique!

The first letter gives the 500 km by 500 km square. 25 different letters (omitting I because it looks too much like the digit 1) could be given here though only four are actually used to map land areas:

S - South West

T - South East

N - North and Scotland

Navigation

H - Shetland Islands

The measurement of a reference is made easier by the regular grid of squares representing 1 km (or 10 km) on the ground and printed on every map. The references of those grid lines are shown on the margins of the map and, on some, at intervals across the map. To determine a reference on a map with a 1 km grid:

Note the letters square from a description in the margins of the map or overprinted in the corners (eg SH)

Read off the two digit eastings number at the bottom or top of the map against the vertical line to the left of the point (eg 80)

Estimate (or use a roamer) the horizontal distance in tenths from the line (eg 5)

Read off the two digit northings number against the side of the map (eg 30)

Estimate (or use a roamer) tenths north from this (9)

The resulting reference SH 805 309 resolves to 100 metres

NOTE: If you get stuck the process is described on the margin of every OS map!

The margins of the maps also have 'ticks' and blue crosses on the body of the map that are used to indicate latitude and longitude.

BGMA TIPS!

You will find references to three different "Norths" in the margin of every OS maps.

True north is just that - a line straight to the North Pole. This is the axis that the Earth rotates on.

Grid North, as defined by the grid lines on the map. These do not match true north because the map is a flat representation of a curved surface.

Magnetic North, as defined by a magnetic compass. This too does not coincide with true or grid north and moves slowly over time.

Navigation

This difference between magnetic and grid bearings is called magnetic variation in Britain. In the US it is referred to as declination. Helpfully, the OS call it neither, instead choosing to complicate the issue and talk about magnetic north variations based on a particular point on each map.

Navigation Skills

Timing

In daylight and on relatively easy ground, the time to reach a target can be estimated reasonably accurately, and this can be a useful alternative in featureless areas.

At an average walking speed of 5 kph (kilometres per hour), it takes 1.2 minutes to cover 100 metres. For each 10 metres of ascent, an extra minute should be added. The time for each leg is pre-calculated and a stopwatch is used to measure the time taken. (many watches have a stopwatch function). Thus a leg of 300 metres with 35 metres of ascent will take 3 x 1.2 minutes (3.6 minutes), plus 3.5 minutes for the uphill work – i.e. 7.1 minutes at 5 kph. Each 0.1 of a minute is 6 seconds, although its unlikely that this level of accuracy would be achieved.

Rough ground or darkness will interfere with this calculation, however.

BMGA TIPS!

The speed of the party can be measured by timing the group over a level section with a known distance – i.e. between two easily identifiable points with distance measured directly from the map.

At 4 kph 100 metres will take 1.5 minutes

At 3 kph 100 metres will take 2 minutes

At 2 kph 100 metres will take 3 minutes

A heavy backpack is likely to reduce speed by at least 1 kph.

Walking downhill is timed at the same rate as level walking although if the downhill slope is gentle it may increase speed by about 1 kph.

Timing is also affected by wind. A strong headwind will slow things down, and a strong wind at your back will speed things up.

You'll just have to practice in all sorts of conditions until you find timings that work for you

Navigation

Pacing

Pacing is the counting of double paces to determine the distance covered.

The walker needs to establish how many paces it takes him or her to cover 100 metres on various types of terrain. This requires a lot of practice and every opportunity should be taken to count and note numbers of paces when out walking.

If you lead with your right foot, the pace counting starts with each placement of the left foot.

Having established how many paces it takes to cover 100 metres the walker needs some means of keeping track of how many paces have been counted. Some compasses have a clicker on the side and this is normally clicked every 100 metres, and the count restarted.

Some walkers use beads attached to a short length of line which can be attached to the wrist (a sort of walkers' rosary), and a bead is moved along it every 100 metres. Alternatively, move stones or sweets from one pocket to another (no munching now).

To use pacing effectively, the distance to the Target from a known point must be known.

Most Compasses have a measure along the side and the distance to the Target can be measured directly from the map.

If the compass shows centimetres/millimetres, then 1 cm is 250 metres on an Ordnance Survey Explorer 1:25000 scale map (*Orange Cover*) and 500 metres on an Ordnance Survey Landranger 1:50000 scale map (*Pink Cover*).

Similarly 1mm is 25 metres on a 1:25000 scale map and 50 metres on a 1:50000 scale map.

With practice, Pacing can be reasonably accurate providing targets are kept relatively close to each other - i.e. 100 to 400 metres - and accurate measurements are taken from the map.

Its important that the walker is not distracted by conversation whilst counting paces. Due to the thickness of the lines on the compass, and the fact that features are hardly ever spaced an even number of 100 metre sections apart, measuring the distance on the map also requires some practice.

Navigation

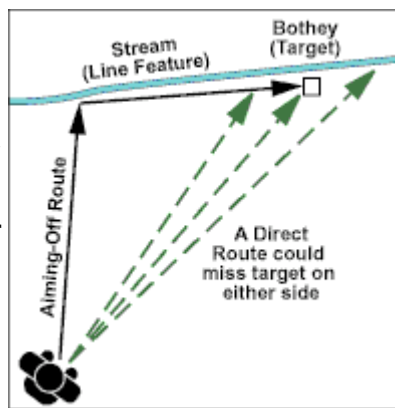
Steep uphill sections will considerably shorten the length of paces, as will terrain like boulder fields and slippery rocks. Pacing is also pretty useless when scrambling.

Aiming Off

Aiming at a Line Feature deliberately to one side of a Target.

Reaching the Target directly could be difficult in poor visibility, and if it is missed, the walker would not know which direction to go in order to find it.

Aiming-Off is deliberately heading to reach a Line Feature some distance to the left (or right) of the Target.



When the Line Feature is reached the walker will know which direction to go along the Line Feature (i.e. Handrail the Line Feature) to reach the Target.

Examples of Aiming-Off might be:

- **aiming for a Stream** (Line Feature) to the **West of a Bothy** (The Target). Once the stream is reached the walker will know to head East beside it (or Handrail the stream) to reach the Bothy (see above)
- aiming for a **Field Boundary Wall** (Line Feature) to the **South of a Trig Point** (The Target). As soon as the Field Boundary is reached the walker will know to head North beside it (or Handrail the Field Boundary Wall) to reach the Trig Point.

Navigation

Catching Features

Something in the landscape that will indicate that a Target has been missed. e.g. walking downhill could indicate that a summit has been missed, reaching a forest edge which you know lies beyond the Target.

Catching Features should be identified **BEFORE** embarking on each leg of the walk.