MAPWORK CALCULATIONS 10 APRIL 2014

Lesson Description

In this lesson we:

- Examine important terms and explain key concepts
- Develop key skills in a step by step sequence
- Sample questions to help you practise and apply key skills
- Identify useful hints and tips in applying these skills

Summary

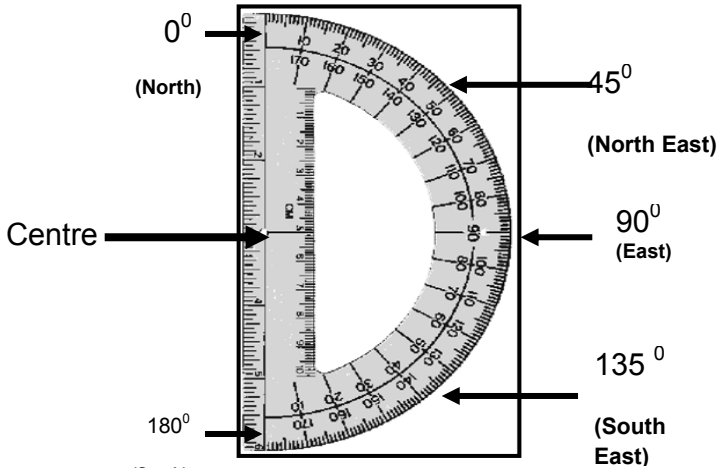
Relative Position

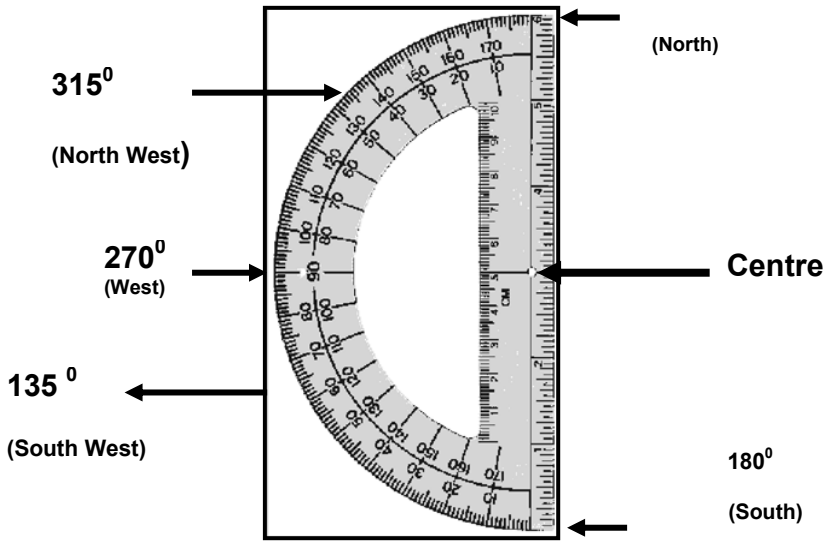
Bearing is the angular (angle) distance between two points

- True Bearing – An angle between 0 and 360 measured from the True North (The Geographic North Pole) line to the line joining the other two places on a map.
- Magnetic Bearing – an angle measured from the Magnetic North (The North line on a compass) line to the line joining the other two places on a map.
- Magnetic Declination – The angle given in degrees between True North and Magnetic North.

How to determine the true bearing

Bearing is an accurate way of giving the direction of one place in relation to another. It is more accurate than direction because it has 360 degree points compared to the 16 points of a compass. Instead of saying, for example, that place A is north east of place B, we use degrees. So we would say that place B is situated at 45° from place A.

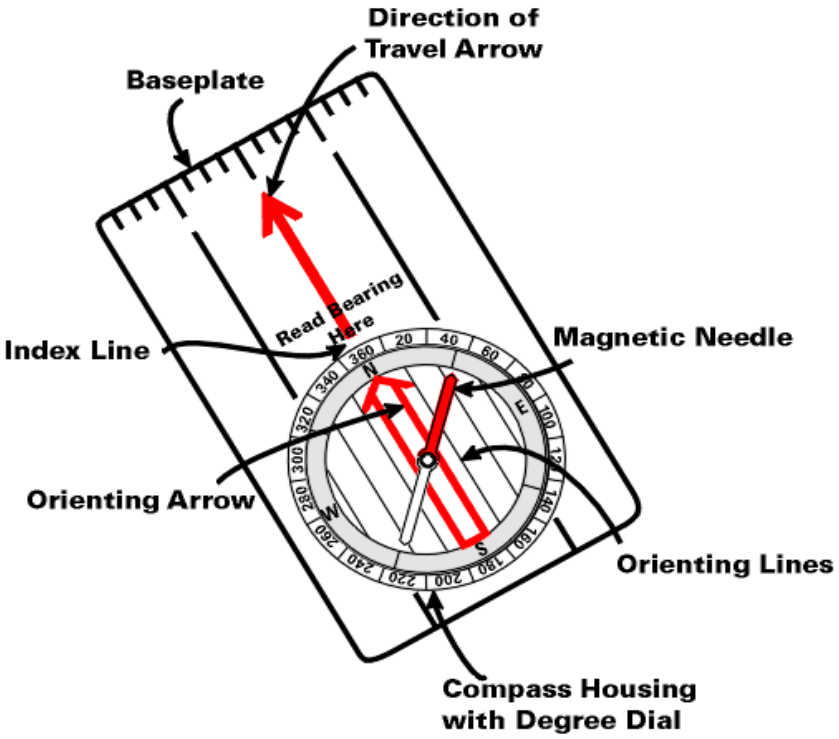




Using the Compass

The compass consists of a magnetized metal needle that floats on a pivot point. The needle orients to the magnetic field lines of the earth. The basic orienteering compass is composed of the following parts:

- Base plate
- Straight edge and ruler
- Direction of travel arrow
- Compass housing with 360 degree markings
- North label
- Index line
- Orienting arrow
- Magnetic needle (north end is red)

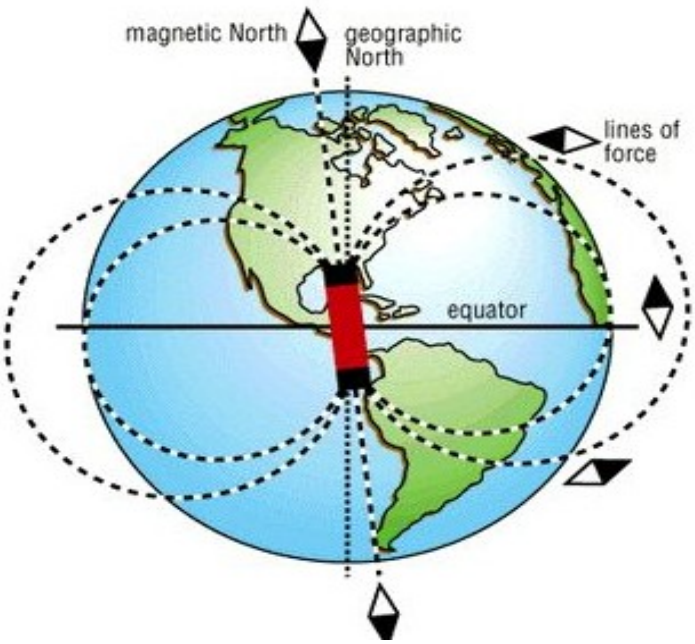


The updating of the magnetic declination

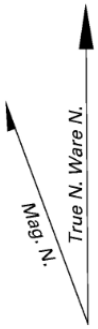
What is north?

True North: (also known as Geographic North or Map North - marked as N on a topographic map - is the geographic North Pole where all longitude lines meet. All maps are laid out with true north directly at the top. Unfortunately for the wilderness traveller, true north is not at the same point on the earth as the magnetic North Pole which is where your compass points.

Magnetic North: Think of the earth as a giant magnet (it is actually). The shape of the earth's magnetic field is roughly the same shape as the field of a bar magnet. However, the earth's magnetic field is inclined at about 11º from the axis of rotation of the earth, so this means that the earth's magnetic pole doesn't correspond to the Geographic North Pole and because the earth's core is molten, the magnetic field is always shifting slightly. The red end of your compass needle is magnetized and wherever you are, the earth's magnetic field causes the needle to rotate until it lies in the same direction as the earth's magnetic field. This is magnetic north (marked as MN on a topographic map.



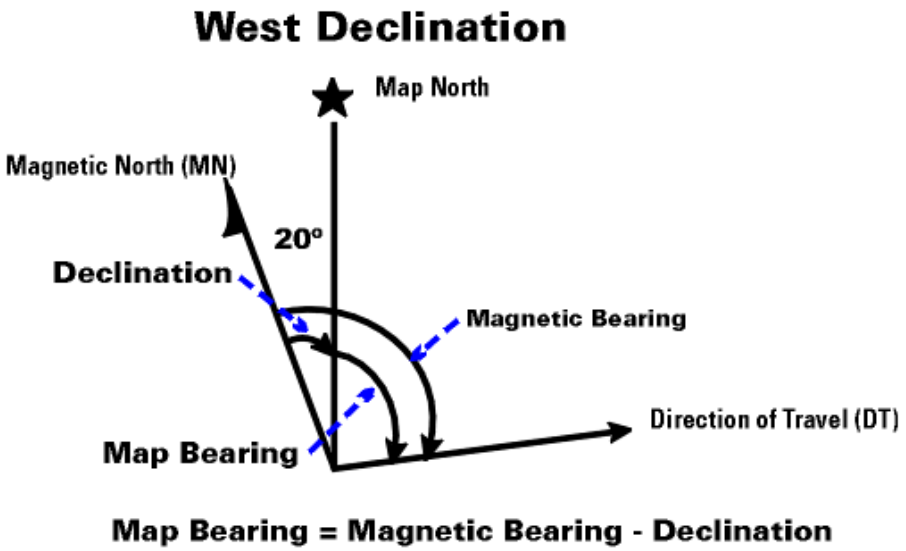
The information on the MARGIN of the map



Mean magnetic declination 20°35′ West of True North(July 2001).
Mean annual change 6′ Westwards(1995–2000).
Supplied by Hermanus Magnetic Observatory.

Gemiddelde magnetiese deklinasie 20°35′ Wes van Ware Noord(Julie 2001).
Gemiddelde jaarlikse verandering 6′ Weswaarts(1995–2000).
Voorsien deur die Hermanus Magnetiese Observatorium.

- True North is shown by the vertical straight line
- Magnetic North is shown by the arrow pointing to the west of True North
- The Magnetic Declination can be measured as the angle between the Magnetic North and the True North
- The Mean magnetic declination is 20 35 west of True North
- The Mean annual change is 6 Westwards
- The year the map was drawn is 2001



Calculating a Magnetic Bearing

The formula for calculating Magnetic bearing is:

MAGNETIC BEARING = TRUE BEARING + MAGNETIC DECLINATION

Hints

True Bearing

- Do not start at the wrong place when place when measuring a bearing. Remember to draw the north-south line through the "from" point in the question.
- Align your protractor with the base of the protractor in the vertical position. This ensures that the 0 is aligned with the true north line.
- Remember to read off the protractor degrees from north in a clockwise direction.

Magnetic declination

- When updating a magnetic declination, make sure that you read the information given carefully so you know whether to add or subtract the update
- (Add if the annual change is west and subtract if the annual change is east)

Magnetic Bearing

- As Magnetic north is always to the west of True north on South African maps, you will always add the updated magnetic declination to the true bearing to calculate the magnetic bearing.

Improve your Skills

Question 1

Use the Topographical Map of Rustenburg

Calculate the Magnetic Bearing of Δ 228 [J7] from Δ 46 [J5] for the present year.

Question 2

Use the Topographical map of Caledon

Calculate the Magnetic bearing of Vlaeberg [F9] from Leeukop [E11] for the present year.

Question 3

Use the Topographical map of Merrivale

Calculate the Magnetic bearing of Δ324 [C3] from Δ80 [B5] for the present year. (6)

Question 4

Use the Topographical map of Vryheid

Calculate the Magnetic bearing of Δ381 [B5] from Δ 103 [D4] for the present year. (6)

Links

- http://en.wikipedia.org/wiki/Toposcope