

Conversion of Bearings

Calculating the Grid Magnetic Angle

To calculate the new Grid Magnetic Angle (GMA) take the age of the map in years (AGE) multiply it by the annual change (AC), then subtracted this from the old GMA on the map (OLD).

$$\text{OLD} - (\text{AGE} \times \text{AC}) = \text{NEW}$$

Where:

OLD: when the map is printed, the GMA at the time of printing is conveniently put on there for you.

(AGE x AC): also printed on the map is how much the GMA changes by changes by every year. If it changes by one degree every year, and the map is three years old, it has changed by a further three degrees. So the bit in brackets would be 3 in this case. It's often not as easy as this to figure out, however.

NEW: the result of your sum is the current difference between grid north and mag north, worked out from the info on the map.

Don't forget, degrees are made of 60 "minutes" - they are written with a little single apostrophe after. 10 minutes would look like **10'**. However, we can only work to the nearest degree, so don't forget to round down or up to the nearest full degree, right at the end.

Worked Example 1

A map printed in 1998 has a GMA of 3 and half degrees. The GMA decreases by 9 minutes a year.

$$\text{OLD} - (\text{AGE} \times \text{AC}) = \text{NEW}$$

$$\text{OLD} = 3 \text{ degrees } 30 \text{ minutes}$$

$$\text{AGE} = 10 \text{ years}$$

$$\text{AC} = 9 \text{ minutes}$$

$$3 \text{ degrees } 30 \text{ minutes} - (10 \times 9 \text{ minutes}) = \text{NEW}$$

let's do the bit in brackets first: 10 x 9 minutes is 90 minutes

$$3 \text{ degrees } 30 \text{ minutes} - 90 \text{ minutes} = \text{NEW}$$

if there are 60 minutes in a degree, then 90 minutes is 1 degree 30 minutes. This is nice and easy.

3 degrees 30 - 1 degrees 30 = NEW

2 degrees is the new GMA.

Worked Example 2

A map printed in 2004 has a GMA of 2 degrees 17 minutes. The GMA decreases by 7 minutes a year.

OLD - (AGE x AC) = NEW

OLD = 2 degrees 17 minutes

AGE = 4 years

AC = 7 minutes

2 degrees 17 minutes - (4 x 7 minutes) = NEW

let's do the bit in brackets first: 4 x 7 minutes is 28 minutes

2 degrees 17 minutes - 28 minutes = NEW

Don't forget, there are 60 minutes in a degree. 2 degrees 17 minus 28 equals 1 degree 49.

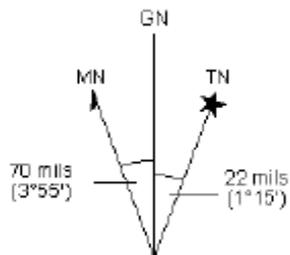
2 degrees 17 minutes - 28 minutes = 1 degree 49

but we can't set our compass to 1 degree 49. What's closest? 1 or 2 degrees? It's a lot closer to 2 than 1, so we round up.

2 degrees is the new GMA.

Worked Example 3

**MAGNETIC INFORMATION (1998)
for centre on sheet**



Annual change 2 mils (7')E

This is an example of the grid magnetic variation which is displayed on the margin of the map sheet. The magnetic angle in 1998 is 70 mils (3°55') West. The year is now 2003 and the annual change is 2 mils (7') East.

OLD = 3 degrees 55 minutes

AGE = 5 years

AC = 7 minutes

OLD - (AGE x AC) = NEW

3 degrees 55 minutes - (5 x 7 minutes) = NEW

3 degrees 55 minutes - (35 minutes) = NEW

3 degrees 20 minutes = NEW This approximately = 3 Degrees