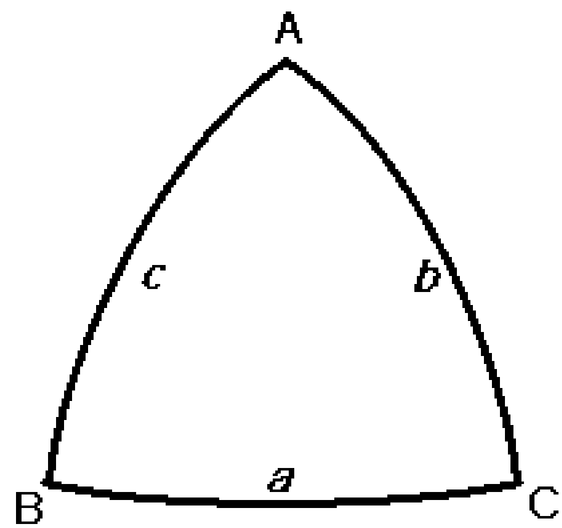
A few useful Spherical Trigonometry Formulae

As in plane trigonometry the angles of a spherical triangle are referred to as A, B and C, and the sides *a*, *b* and *c* are expressed in angular measure.



$\cos a = \cos b \times \cos c + \sin b \times \sin c \times \cos A$
$\cos b = \cos c \times \cos a + \sin c \times \sin a \times \cos B$
$\cos c = \cos a \times \cos b + \sin a \times \sin b \times \cos C$

$\cos A = -\cos B \times \cos C + \sin B \times \sin C \times \cos a$
$\cos B = -\cos C \times \cos A + \sin C \times \sin A \times \cos b$
$\cos C = -\cos A \times \cos B + \sin A \times \sin B \times \cos c$

In any spherical triangle

$$\frac{\sin a}{\sin A} = \frac{\sin b}{\sin B} = \frac{\sin c}{\sin C}$$

If three sides of a spherical triangle are known then:

$$\text{Hav}\, A = \text{cosec}\, b \times \text{cosec}\, c \times \sqrt{\text{hav}\, [a + (b \sim a) \times \text{hav}\, [a - (b \sim c)}$$

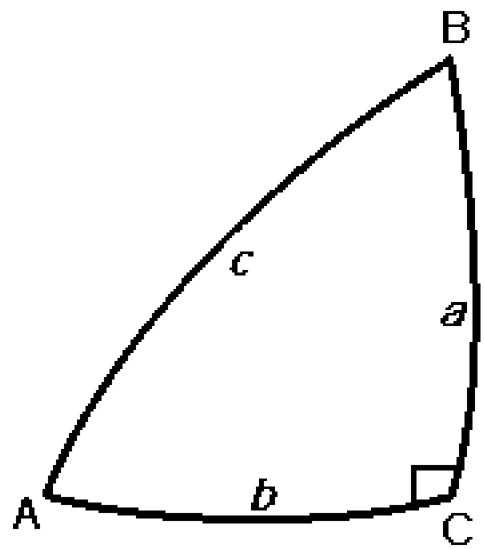
In a **right spherical triangle**, that is with angle **C** being a 90° angle the following hold true:

$\sin a = \sin A \times \sin c$
$\sin b = \sin B \times \sin c$

$\tan a = \cos B \times \tan c$
$\tan a = \tan A \times \sin b$
$\tan b = \cos A \times \tan c$
$\tan b = \tan B \times \sin a$

$\cos A = \sin B \times \cos a$
$\cos B = \sin A \times \cos b$

cos ***c*** = cos ***a*** x cos ***b***
cos ***c*** = cot **B** x cot **A**



AREA

The area of a spherical triangle *as measured on the surface of the earth* is:

A + **B** + **C** - **pi**

Where **A**, **B**, **C** are expressed in Radians. To convert degrees to radians multiply by pi/180. The answer will be in Radians squared and needs to be multiplied by (180/pi * 180/pi) to give square degrees which needs to be multiplied by 3600 to give square nautical miles. Alternately multiply the answer by 11818102.86.

The area of any other spherical triangle is:

(**A** + **B** + **C** - **pi**) x $\mathbf{R}^2$

Where R, in radians, is the radius of the sphere on which the triangle occurs.

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