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Area of a Spherical Triangle:

Add the areas of the three lunes defined by the angles of the spherical triangle. This gives you the sum of half the sphere plus the area of the triangle two extra times. Subtract off half the area of the sphere from the sum of the three lunes, and you are left with twice the area of the spherical triangle. Then simply divide the remaining area by two and you have the area of the spherical triangle.

$$A = \frac{(\frac{a+b+c}{360})S - \frac{S}{2}}{2}$$