

# Spherical Trigonometry for Dummies

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# Spherical Trigonometry for Dummies

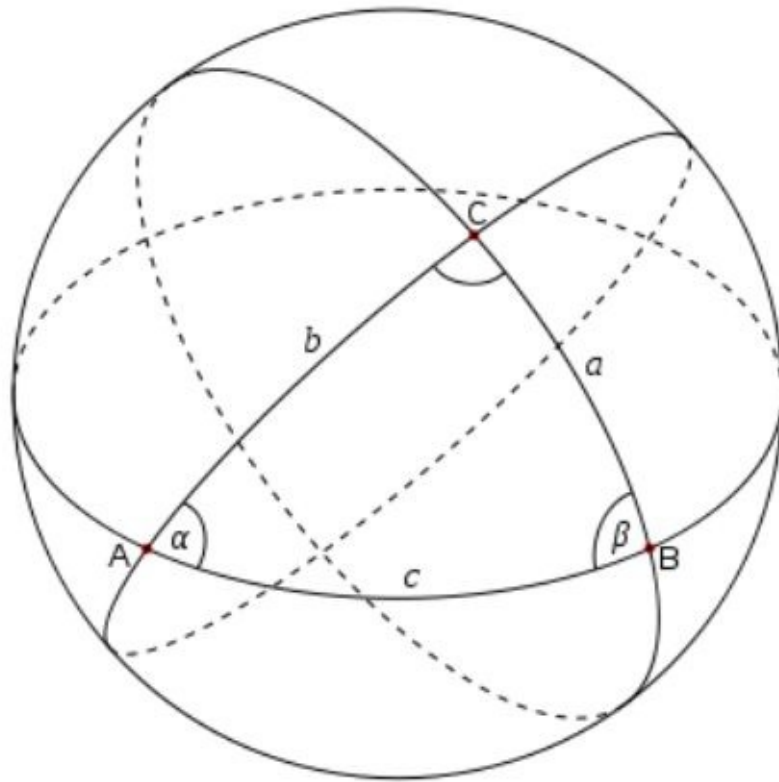
## Proving we live on a flat earth

Spherical trigonometry is the study of curved triangles, triangles drawn on the surface of a sphere. The subject is practical, for example, because we don't live on a sphere. The subject has numerous elegant and unexpected theorems. I give a few below. For starters. To find the curvature of the earth. You must use Stanford's 8 Inches per Mile Squared to find it. Using the theorem of

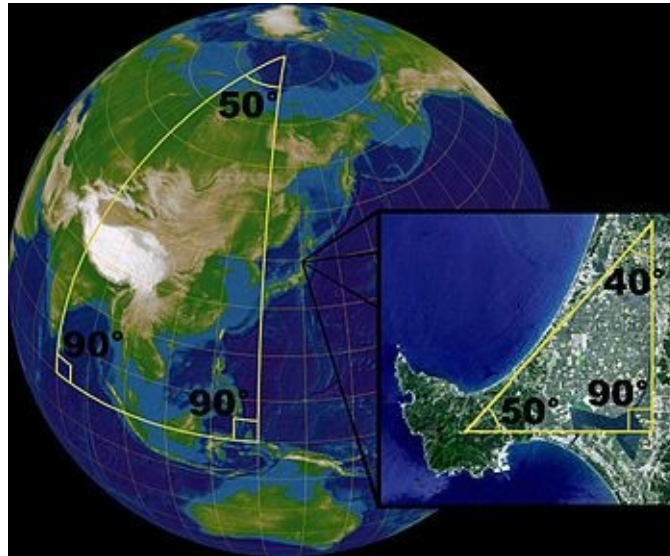
Pythagoras  $a^2$  this number above the a means squared =  $3963^2$  again here the number is SQUARED + 12.

Notice this number 2? THAT MEANS SQUARED. A two next to any number on the top right is SQUARED. Many people do not understand what a squared number looks like. NOW YOU KNOW.





The diagram shows the spherical triangle with vertices  $A$ ,  $B$ , and  $C$ . The angles at each vertex are denoted with Greek letters  $\alpha$ ,  $\beta$ , and  $\gamma$ . The arcs forming the sides of the triangle are labeled by the lower-case form of the letter labeling the opposite vertex.



From the fake sphere on the left to the correct flat 2 dimensional earth that is real and tangible. We don't theorize here. We leave that for blowhards like Newton and Einstein whose theories have always been debunked. No wonder Tesla called Einstein "a fraud." No wonder Electrical Engineers cannot stand Physics. It's all based on THEORIES.



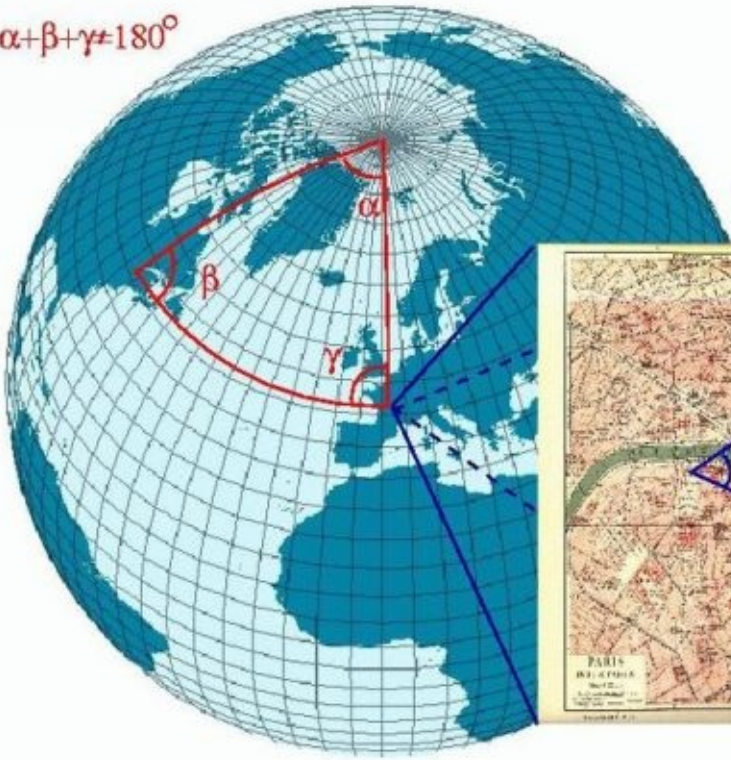
On a sphere, the sum of the angles of a triangle is not equal to  $180^\circ$ . A sphere is not a Euclidean space, but locally the laws of the Euclidean geometry are good approximations. In a small triangle on the face of the earth, the sum of the angles is very nearly 180. The surface of a sphere can be represented by a collection of two dimensional maps. Therefore it is a two dimensional manifold.

A **manifold** is a concept from [mathematics](#). Making a manifold is like making a flat map of a non-sphere (the Earth).

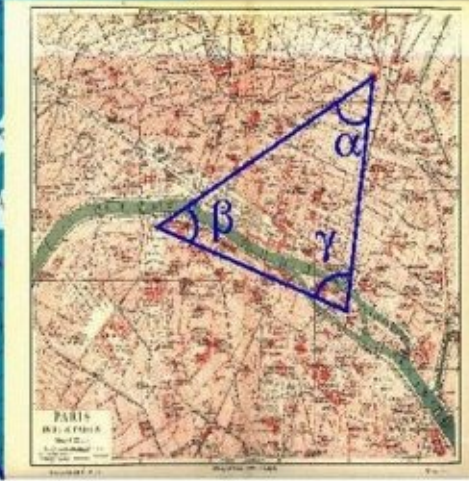
The Earth is not a [sphere](#), (a three dimensional object of [geometry](#)). [Maps](#) (two-dimensional representations) can be made of the Earth as most textbooks will not show you. I'm debunking them right now before your eyes. At the [edges](#) of a certain map, the map needs to be changed. That way it is possible to make a two dimensional image of the whole [surface](#) of the Earth. There need to be [rules](#), on how to change the maps, and some [areas](#) (near the edges of the map) will be on more than one map. It is not possible to make one map only, which would have no edges. This map would either have edges (and overlapping areas), or there would be some places where the paper was torn.

Each manifold has a [dimension](#). This is the dimension of the maps, in the example above. It is the same for all maps.

$$\alpha + \beta + \gamma \neq 180^\circ$$



$$\alpha + \beta + \gamma = 180^\circ$$



## Basic properties

On the plane, the sum of the interior angles of any triangle is exactly  $180^\circ$ . On a sphere, however, the corresponding sum is always greater than  $180^\circ$  but also less than  $540^\circ$ . That is,  $180^\circ < \alpha + \beta + \gamma < 540^\circ$  in the diagram above. The positive quantity  $E = \alpha + \beta + \gamma - 180^\circ$  is called the **spherical excess** of the triangle.

Since the sides of a spherical triangle are arcs, they can be described as angles, and so we have two kinds of angles:

1. The angles at the vertices of the triangle, formed by the great circles intersecting at the vertices and denoted by Greek letters.
2. The sides of the triangle, measured by the angle formed by the lines connecting the vertices to the center of the sphere and denoted by lower-case Roman letters.

The second kind of angle is most interesting. In contrast to plane trigonometry, the sides of a spherical triangle are themselves angles, and so we can take sines and cosines etc. of the *sides* as well as the vertex angles.



## Right spherical triangles

For this section, assume the angle  $\gamma = 90^\circ$ , i.e. we have a spherical right triangle. Then the following identities hold.

- $\sin a = \sin \alpha \sin c = \tan b \cot \beta$
- $\sin b = \sin \beta \sin c = \tan a \cot \alpha$
- $\cos \alpha = \cos a \sin \beta = \tan b \cot c$
- $\cos \beta = \cos b \sin \alpha = \tan a \cot c$
- $\cos c = \cot \alpha \cot \beta = \cos a \cos b$

Napier's rule is a mnemonic for memorizing the above identities.

Trigonometry uses a large number of specific words to describe parts of a triangle. Some of the definitions in trigonometry are:

- **Right-angled triangle** - A right-angled triangle is a triangle that has an angle that is equal to 90 degrees. (A triangle can not have more than one right angle.) The

standard trigonometric ratios can only be used on right-angled triangles.

- **Hypotenuse** - The hypotenuse of a triangle is the longest side, and the side that is opposite the right angle. For example, for the triangle on the right, the hypotenuse is side  $c$ .
- **Opposite** of an angle - The opposite side of an angle is the side that does not intersect with the vertex of the angle. For example, side  $a$  is the opposite of angle  $A$  in the triangle to the right.
- **Adjacent** of an angle - The adjacent side of an angle is the side that intersects the vertex of the angle but is not the hypotenuse. For example, side  $b$  is adjacent to angle  $A$  in the triangle to the right.

# Trigonometric ratios

There are three main trigonometric [ratios](#) for right triangles, and three [reciprocals](#) of those ratios. There are 6 total ratios. They are:

**Sine** (sin) - The sine of an angle is equal to the  $\frac{\textit{Opposite}}{\textit{Hypotenuse}}$

**Cosine** (cos) - The cosine of an angle is equal to the  $\frac{\textit{Adjacent}}{\textit{Hypotenuse}}$

**Tangent** (tan) - The tangent of an angle is equal to the  $\frac{\textit{Opposite}}{\textit{Adjacent}}$

The reciprocals of these ratios are:

**Cosecant** (csc) - The cosecant of an angle is equal to the  $\frac{\textit{Hypotenuse}}{\textit{Opposite}}$  or  $\textit{csc } \theta = \frac{1}{\sin \theta}$

**Secant** (sec) - The secant of an angle is equal to the  $\frac{\textit{Hypotenuse}}{\textit{Adjacent}}$  or  $\textit{sec } \theta = \frac{1}{\cos \theta}$

**Cotangent** (cot) - The cotangent of an angle is equal to the  $\frac{\textit{Adjacent}}{\textit{Opposite}}$  or  $\textit{cot } \theta = \frac{1}{\tan \theta}$

Students often use a [mnemonic](#) to remember this relationship. The *sine*, *cosine*, and *tangent* ratios in a right triangle can be remembered by representing them as strings of letters, such as SOH-CAH-TOA:

$$\text{Sine} = \text{Opposite} \div \text{Hypotenuse}$$

$$\text{Cosine} = \text{Adjacent} \div \text{Hypotenuse}$$

$$\text{Tangent} = \text{Opposite} \div \text{Adjacent}$$

or:

**Silly Old Hitler Couldn't Advance His Troops Over America**

or:

**Sitting (or Sex) On Hard Concrete Always Hurts Try Other Alternatives**

## **General spherical triangle**

For this section we drop the assumption that  $\gamma = 90^\circ$ . Many identities hold.

Here are a few examples.

### **Law of sines**

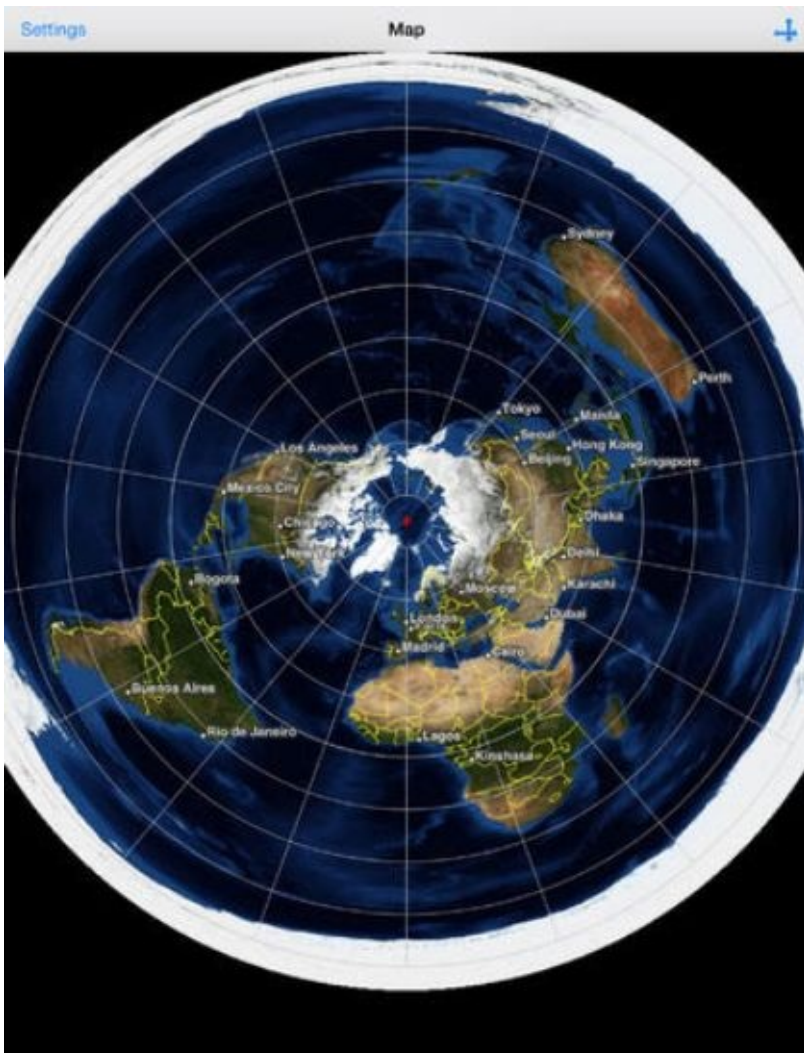
$$\sin \alpha / \sin a = \sin \beta / \sin b = \sin \gamma / \sin c$$

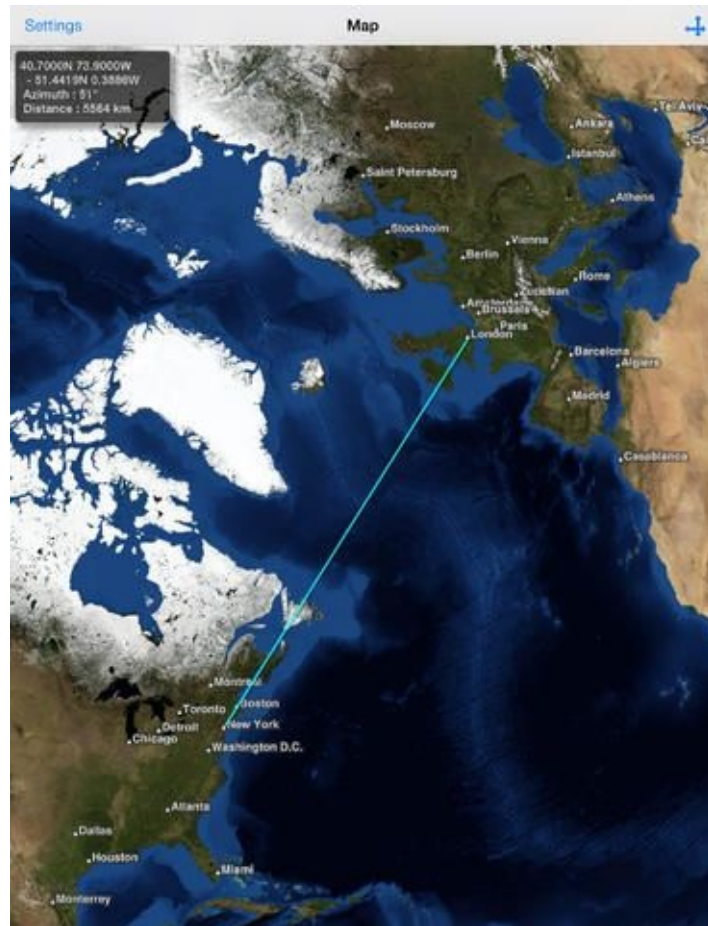
*Like taking candy from your baby!*

*Using Spherical TRIG in everyday life to debunk astro science.*

*It's so much fun!!!*

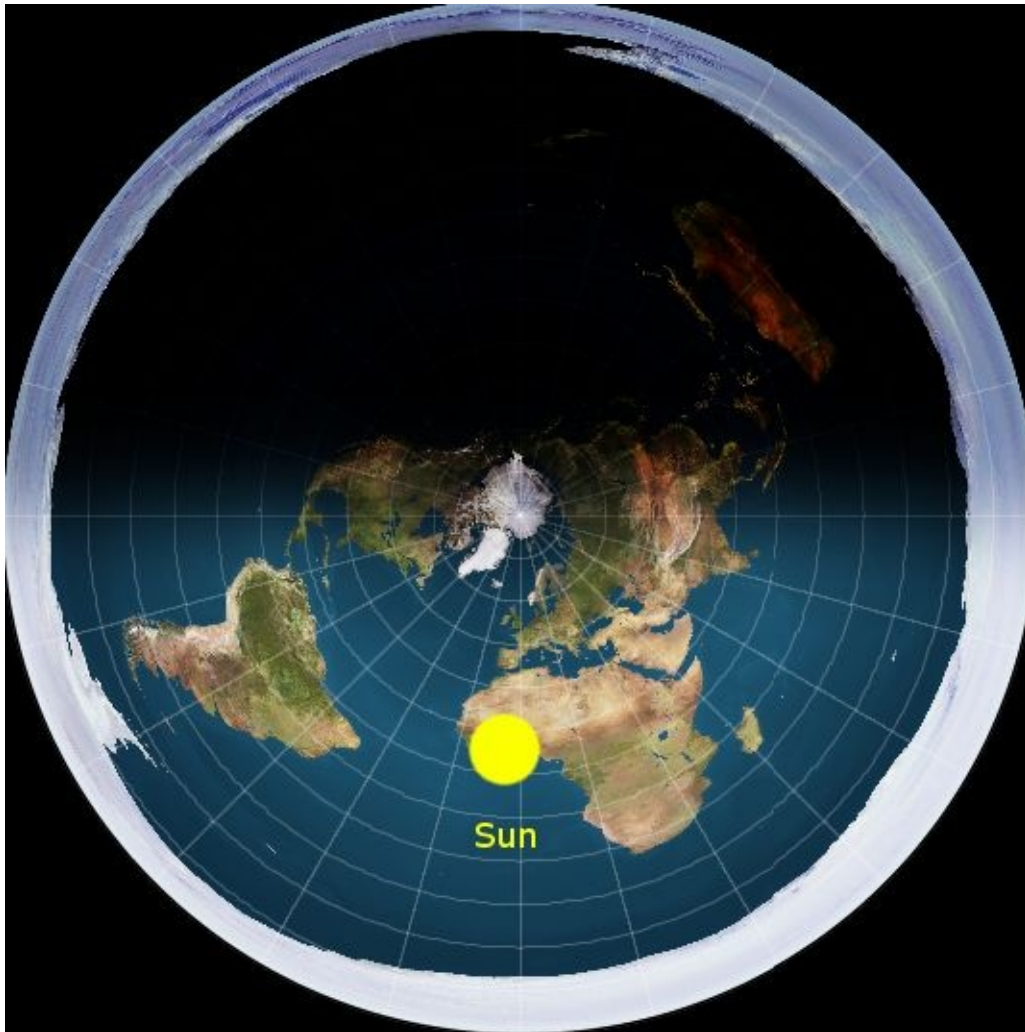






Close up of Flat Earth

What's interesting is the flight schedule and what you have to do to get to your destination. The system is rigged but has been debunked by Rory Cooper

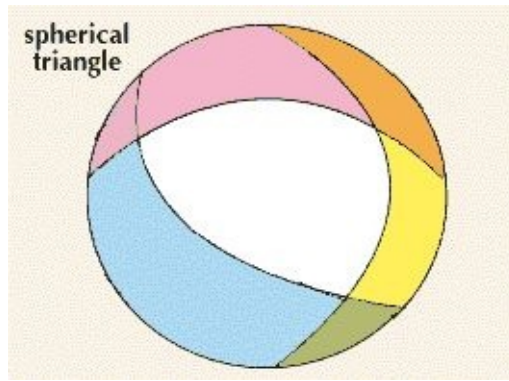


Sun rotates opposite of the moon. All theories collapses on globe earth when I'm done using Spherical Trig. Stay with me...



This just happens to be the logo of the UN  
(Exact flat earth logo)

The UN mocks the world (YOU) and they know the earth is flat



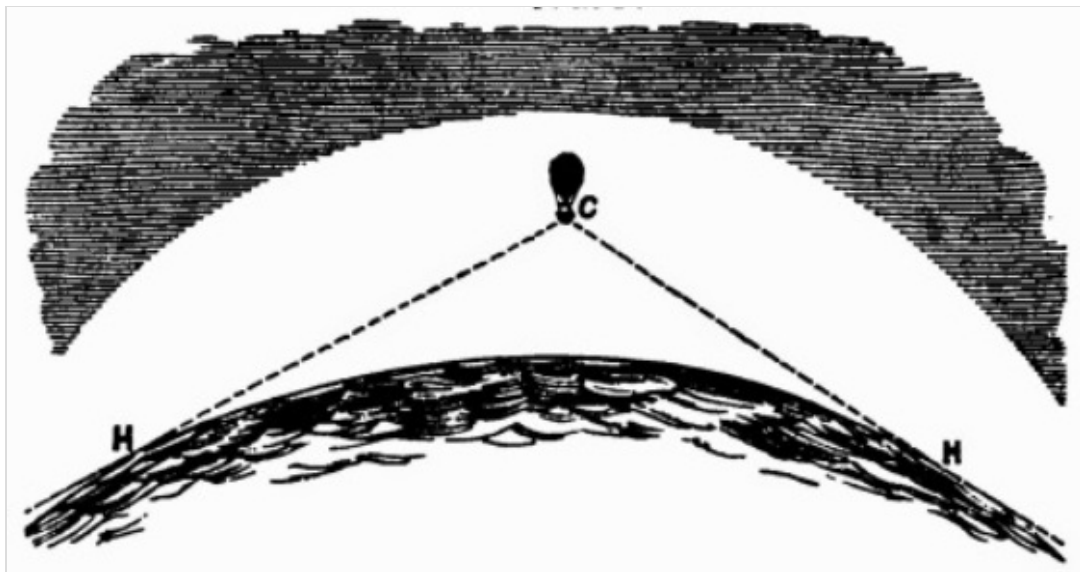
In a spherical triangle the angles add up to more than 180 degrees.



# Is the Earth a Sphere?; Why Doesn't the Horizon Ever Bend?

From sea level we look out from the shore to the ocean and see a flat horizon.

Rising up in a hot air balloon we see the horizon still rising with us, especially at the corners of our field of vision. There is no curving away at the edges which should be happening if the Earth was a globe



If we were on a ball-Earth no matter how big, even if it were a million miles in circumference, **the horizon of any ball Earth by necessity must remain exactly where it is!** A horizon which rises to the eye of the observer can only be an extended flat plane.

If it were a ball, no matter how big, you would have to look DOWN more and more the higher you ascended. Think about it, no matter how big the ball is, if you rose off it in a hot-air balloon and stared straight ahead the whole time, you should be staring off into the “outer-space” beyond the curvature! In reality however, you will be staring directly at the horizon the entire way up without ever tilting your head downwards a single degree. ~

Eric Dubay

# Is the Earth a Sphere? Cruisin' at 30,000 ft.



**“...We'll Be Cruising at 30,000 ft. for the next 4 hours.”**

If the Earth were a sphere, airplane pilots would have to constantly correct their altitudes downwards so as to not fly straight off into “outer space!” If the Earth were truly a sphere 25,000 miles circumference curveting 8 inches per mile squared, a pilot wishing to simply maintain their altitude at a typical cruising speed of 500 mph, would have to constantly dip their nose downwards and descend 2,777 feet (over half a mile) every minute!

Otherwise, without compensation, in one hour's time the pilot would find themselves 166,666 feet (31.5 miles) higher than expected!

A plane flying at a typical 35,000 feet wishing to maintain that altitude at the upper-rim of the so-called “Troposphere” in one hour would find themselves over 200,000 feet high into the “Mesosphere” with a steadily raising trajectory the longer they go. I have talked to several pilots, and no such compensation for the Earth's supposed curvature is ever made. When pilots set an altitude, their artificial horizon gauge remains level and so does their course; nothing like the necessary 2,777 foot per minute declination is ever taken into consideration.

To maintain a 30,000 ft. altitude around a round Earth, the airplane would have to be angled significantly lower than in the rear of the airplane to maintain a 30,000 foot relationship to the Earth's curvature.

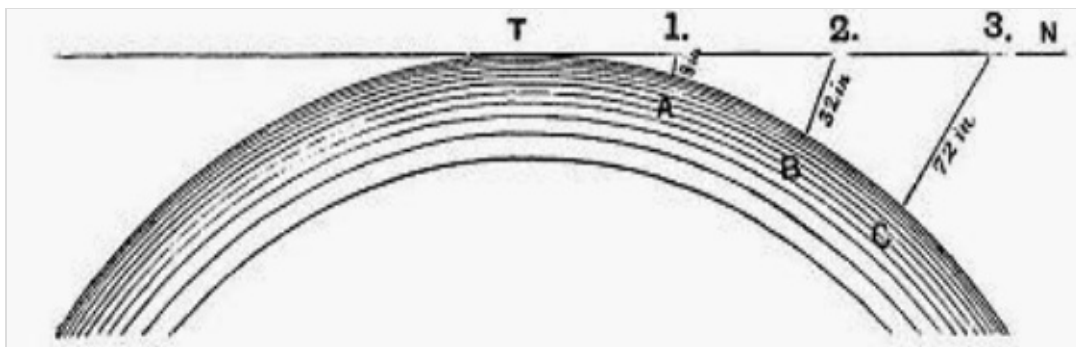
Yet this never, ever happens. When traveling in an airplane it is level from nose to stern.

This means that the Earth is not a globe but is a level piece of land below us while in flight.

If one says that we are in a vacuum and gravity holds us in, then how is plane able to "escape" Earth's gravity pull upon reaching cruising altitude when NASA tells us that it would require

*From the surface of the Earth, escape velocity (ignoring air friction) is about **7 miles per second**, or **25,000 miles per hour**. Given that initial speed, an object needs no additional force applied to completely escape Earth's gravity.*

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### Basic Geometry on a Sphere

The Global Earth theorists for 500 years have been telling us the Earth is a sphere. IF the earth is a globe, and is 25,000 English statute miles in circumference, the surface of all standing water must have a certain degree of convexity—every part must be an *arc of a circle*.

From the summit of any such arc there will exist a curvature or declination of 8 inches in the first statute mile. In the second mile the fall will be 32 inches; in the third mile, 72 inches, or 6 feet, as shown in the diagram above. Spherical trigonometry dictates that a ball-Earth 25,000 miles in circumference would curve 8 inches per mile varying inversely with the square of the mile, so after six miles there would be an easily detectable and measurable 16 feet, 8 inches of downward curvature.

To determine how much the Earth falls away on the curve you take **miles squared X eight inches**. This is an inverse relationship so the farther one travels the greater the distance of feet or miles the Earth will fall away.

Let the distance from T to figure 1 represent 1 mile, and the fall from 1 to A, 8 inches; then the fall from 2 to B will be 32 inches, and from 3 to C, 72 inches. In every mile after the first, the curvature downwards from the point T increases as the square of the distance multiplied by 8 inches. The rule, however, requires to be modified after the first thousand miles. 1

Miles squared X 8 inches

one foot = .000189394 miles

Curvature of Earth

1 mile 5.33 ft. or .12626 mile

10 miles 66.666 ft. or 1.2626 miles

100 miles 6,666.66 ft. or 12.626 miles

So the farther one travels the greater the drop (or rise) in distance.

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Non NASA camera records continual Flat Earth on plane

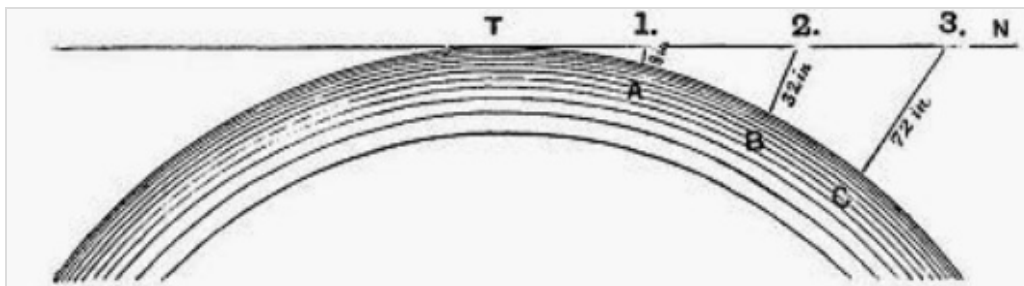
Our flat, motionless Earth! You can clearly see the Sun is NOT 93 million miles away as we're told. This is evidenced by the hot-spot seen on the clouds directly underneath the Sun as it moves over the Earth. Over 20 miles high and the horizon remains perfectly flat and rises to the eye-level of the observer all the way up. If the Earth were a ball, no matter how big, the horizon could not rise with the observer like this. On a ball-Earth the horizon would stay where it was and you would have to look DOWN to the horizon further and further the higher you rose.

# #15 If the Earth is a Curved Sphere, Why Are All Horizons Flat?

[curvature, Earth, Flat Earth March 24, 2015 Leave a comment](#)



According to basic math on a curved round ball the fall off of the curve is measured miles x miles x 8 inches. This we have the following table of feet and miles raised or lowered when traveling on an curved, spheroid science calls our globe.



Miles squared X 8 inches

one foot = .000189394 miles

1 mile            5.33 ft. .12626 mile

6 miles    24 ft.

10 miles    66.666 ft. .2626 miles



100 miles 6,666.66 ft. 1.626 miles

1000 miles 666,666 ft. 12.2625 miles

So on a view of a horizon that stretches dozens of miles in each direction one should easily see the Earth curving away and down dozens of feet on both sides, yet we never, ever do. Even from up in a plane...because we live on a plane, not a sphere



Not much curve o' sphere to see here.



Nor seen out of the ISS Space Station. (NASA Image)

I highly recommend this link and book:

<https://www.youtube.com/watch?v=HF00ZCfd8Do>

**BRIGHAM YOUNG UNIVERSITY**  
**ALUMNI & STUDENTS PROVE:**



**"THE EARTH IS FLAT"**

I wanted to make this “book” more of a cliff note and handy guide.

Thank you

Captain Obvious,

Dr. Lawrence Cohen,

Dr. John Mack,

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