

How Small is "Infinitesimal"?

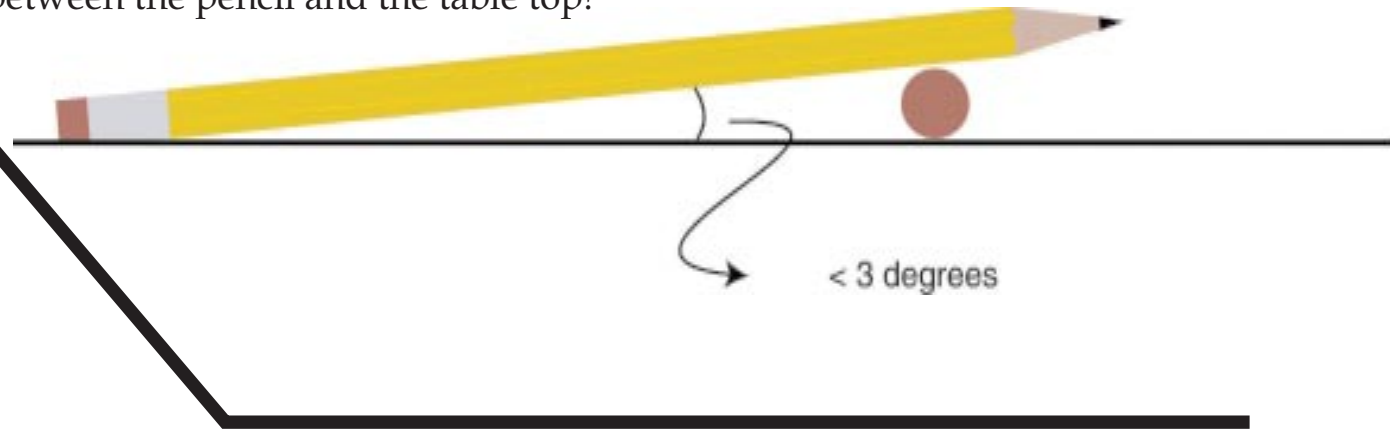
Theoretical calculations predict that at 400 miles (650 km) above the Earth, spacetime turns 42 milliarc-seconds in one year. This number is almost too small to comprehend, much less accurately measure. Forty-two milliarc-seconds is slightly more than one-hundred-thousandth of a single degree!

1 degree = 60 arcminutes
 1 arcminute = 60 arcseconds
 1 arcsecond = 1,000 milliarc-secs
 1 milliarc-sec = 0.000000278 degrees

42 milliarc-secs
 = 1.17 hundred-thousandths
 of a degree

Imagine how small this is!

1. Lean a pencil across another pencil. Look at the angle between the leaning pencil and the table top. This angle is fairly small -- about 2-4 degrees. To imagine how small 42 milliarc-secs is, break this angle into about ten million pieces. The angle we are trying to measure is approximately 10,000,000 times smaller than the angle between the pencil and the table top!



2. Imagine that the two legs of a 42 milliarc-second angle are stretching out into the distance. From where you are standing, you cannot see any space between the lines because the angle is so small. You follow the lines looking closely for when the lines first separate and you measure the distance between them.

At

- one mile..... a sheet of paper (0.4 mm).
- five miles.....a flat penny (1.9 mm).
- 30 miles.....an upright penny (12 mm).
- 450 miles.....a soda bottle (17.1 cm).
- 3,000 miles.....a yardstick (1.1 m).
- 4,500 miles.....a tall human (1.71 m).

fits in between the lines...

