

**People are slow to claim confidence
in undertakings of magnitude.**

Ovid



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SES 194

Energy in Everyday Life

Order of Magnitude Estimate

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What is the circumference of Earth?

Our guidelines for making an order-of-magnitude estimate:

- * **Guess**
- * ***Talk to your gut***
- * ***Divide and conquer***
- * ***Lie skillfully***
- * ***Punt***
- * ***Use guerrilla warfare***
- * ***Lower your standards***
- * ***Cross-check***

TAKE A GUESS

Its more than 1000 miles but less than 1 million miles,
so i'll guess 50,000 miles.

One possible solution path:
How many time zones are there?
How many miles/time zone?



There are 24 hours in a day, so there are 24 time zones.

I know the flight distance from New York to Los Angeles is ~3,000 miles. These cities are 3 time zones apart, so there is 1000 miles/time zone.

The circumference of the Earth is then
24 time zones x 1000 miles/time zone
~ 24,000 miles ~ 36,000 km.



I know it takes ~15 hours to fly about halfway around the world (Australia) and that commercial planes fly ~ 700 miles/hr.

Common Knowledge

Share what you know.

So the circumference of the Earth is
 $2 \times 15 \times 700 \sim 21,000$ miles $\sim 32,000$ km.

This is reassuringly close to my previous estimate and less than a factor of two from my initial guess.