

CALCULATING THE VELOCITY OF THE MOON'S SHADOW AS IT MOVES ACROSS INDIANA ON APRIL 8, 2024

Given:

Directional axis shadow diameter: Approximately 131 miles

Duration of shadow over the centerline near Indianapolis: 4 min 1 sec

How do we know this?

You can search on Google and find a spectrum of information about the eclipse (pun intended). Internet searches are tricky because sometimes it's not clear which solar eclipse is being referenced. For the information above, we simply rely on NASA find reliable references.

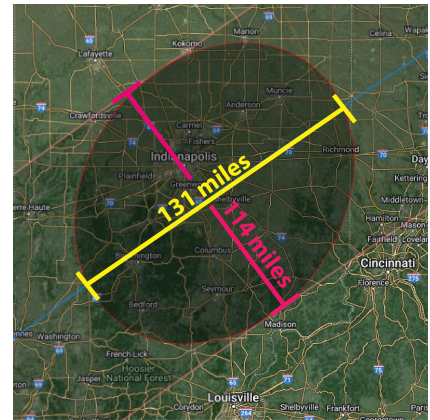
Calculation:

Step One: Convert 4 min 1 sec to hours.

$$\frac{4.0166 \text{ minutes}}{60 \text{ minutes}} = 0.067 \text{ hours}$$

Step Two: Divide the distance by the time.

$$\frac{131 \text{ miles}}{0.067 \text{ hours}} = \mathbf{1,955 \text{ miles per hour}}$$



Source: Google Interactive 2024 Solar Eclipse Map

Approximate ground velocity of the moon's shadow near Indianapolis.

Check our work.

How do we check our work? (1) Double-check the calculations. (2) Have someone else check your calculations. (3) Find a separate reference with this data, and we found one online:

[Path of Totality](#)

How close are those reported data to our calculation?

The shadow velocity also accounts for the Earth's rotational speed.

The Earth is rotating on it's polar axis. To calculate the relative rotational velocity of Carmel, we multiply the cosine of Carmel's Latitude Coordinate 0.76 (cos LAT 39.97 degrees is 0.76) by the rotational at the Equator (1,037 mph) which gives us 795 mph.