Maths or conspiracy?

Dave Hartburn

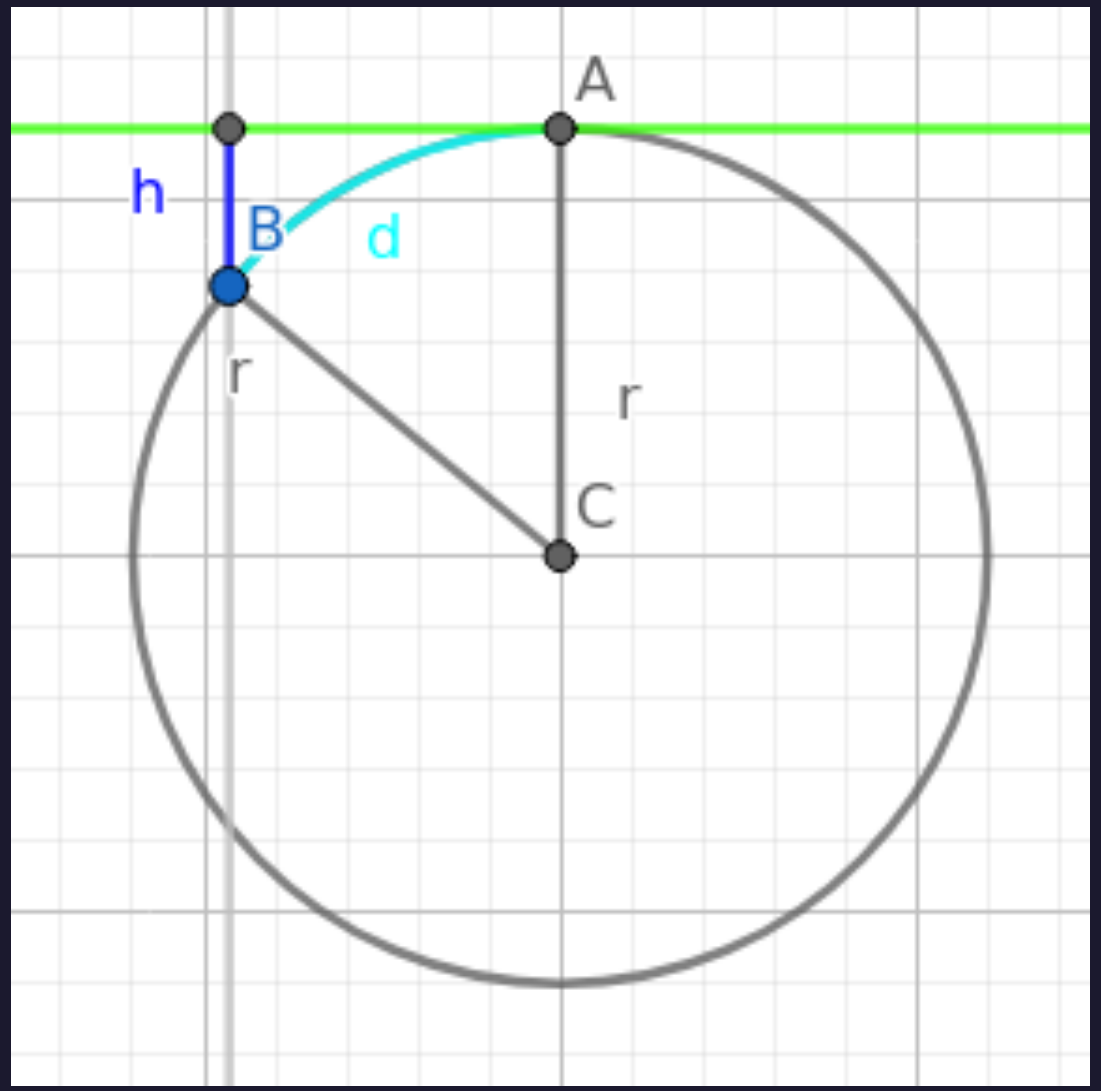
“If the earth was a globe, then the drop to the horizon would be 8 inches per mile squared”

Errr, what?

What does ‘drop from the horizon’ mean?

If an observer is at point A, then their horizon is the tangent to the curve of the earth (or planet radius r)

The vertical distance between a point B at distance d across the surface is the drop (h = height of drop)



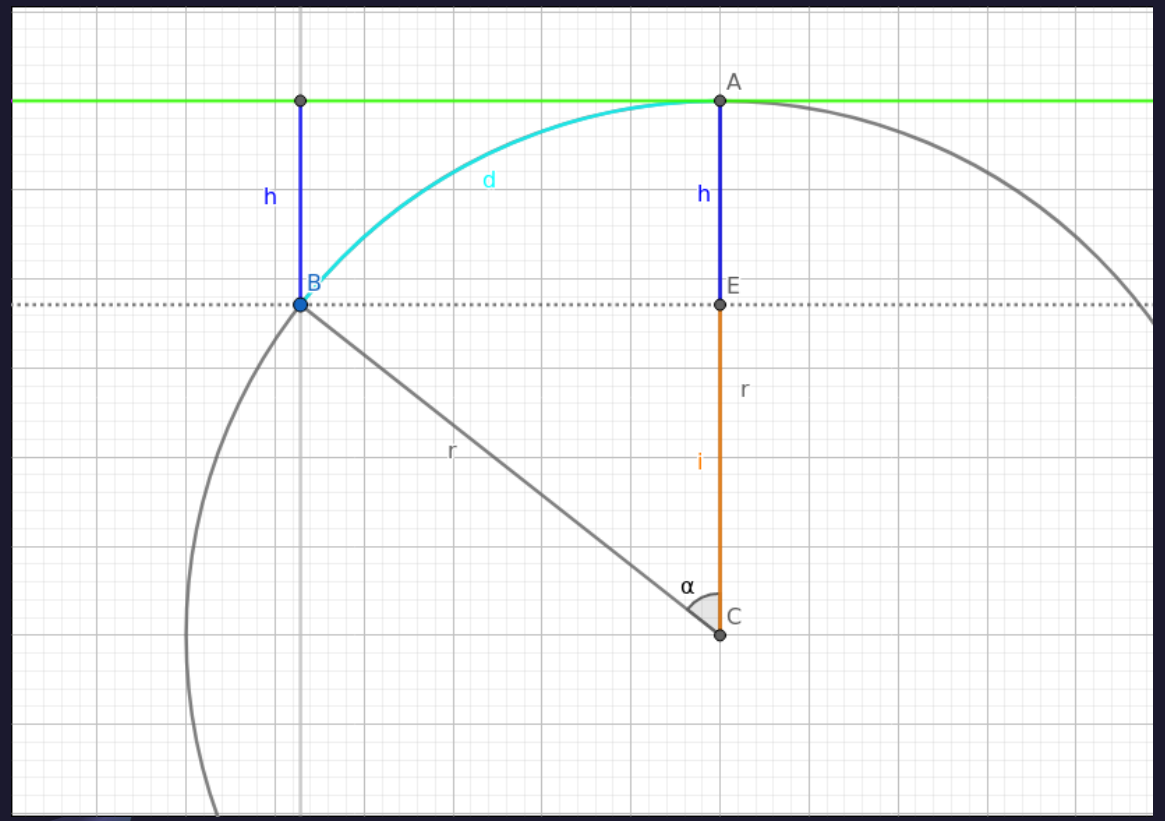
Breaking down the rule

THE DROP TO THE HORIZON WOULD BE 8 INCHES PER MILE SQUARED

- $h = 8d^2$
- h = inches x miles squared
- Units = inch mile squared
- Or units = square mile inches

- Try again in metric, convert to km
- $h = 0.0002032 (d / 1.60943)^2$
- *Where d is in miles*
- Units = cubic km

What about actual maths?



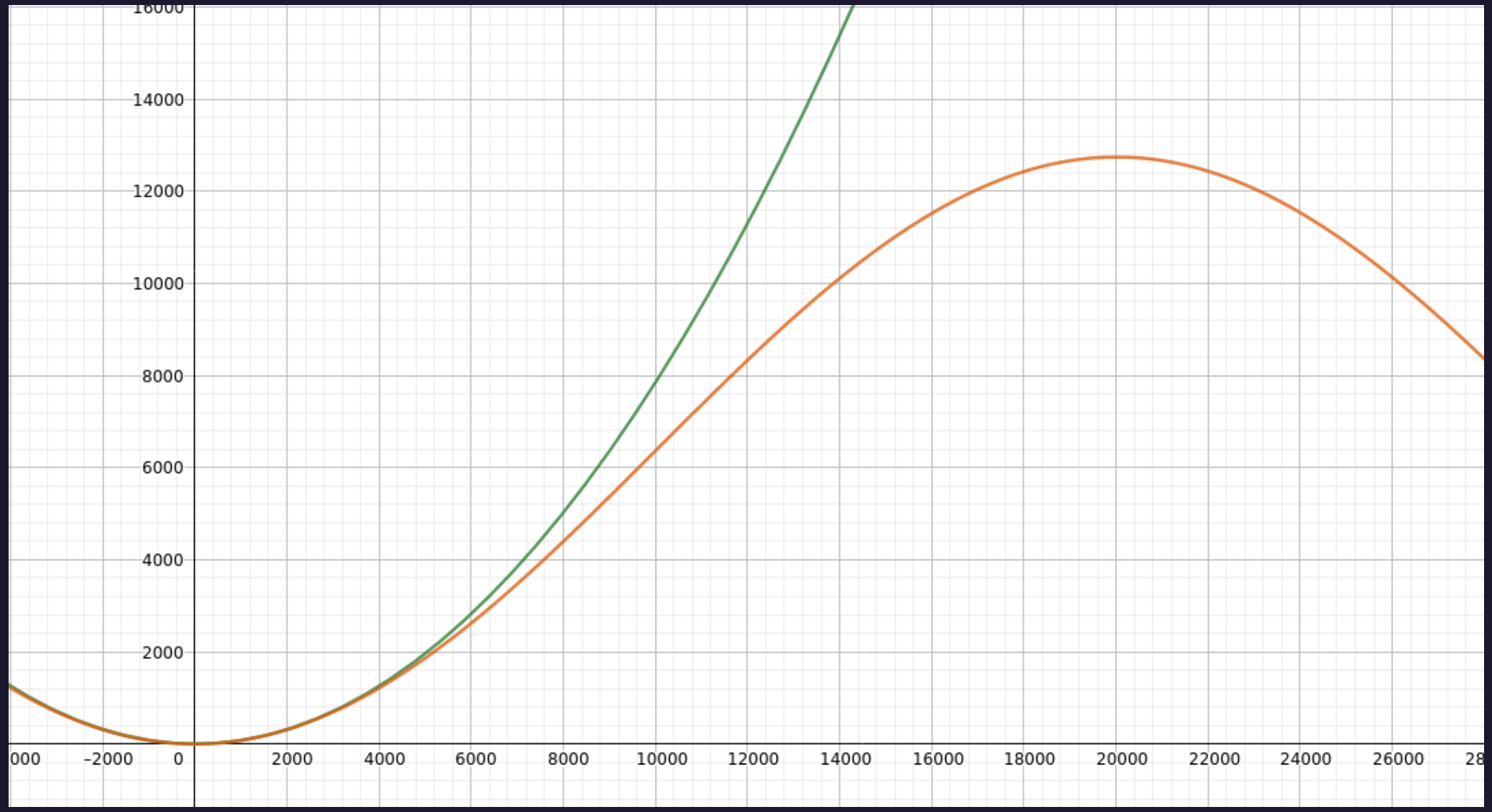
$$i = r\cos\alpha$$
$$h = r - i$$
$$h = r - r\cos\alpha$$
$$\alpha = \frac{d}{r}$$
$$h = r - r\cos\left(\frac{d}{r}\right)$$

Comparison of the rules

Radius of Earth r = 6,371 km

Distance d	Cosine		Square	
Kilometres	Kilometres	Metres	Kilometres	metres
5	0.0020	1.96	0.0020	1.96
10	0.0078	7.85	0.0078	7.84
25	0.0491	49.05	0.0490	49.03
100	0.7848	784.79	0.7845	784.48
400	12.5528	12,552.77	12.5516	12,551.61
1,000	78.3196	78,319.62	78.4476	78,447.57
1,500	175.7672	175,767.19	176.5070	176,507.04

As a graph.....


16000
14000
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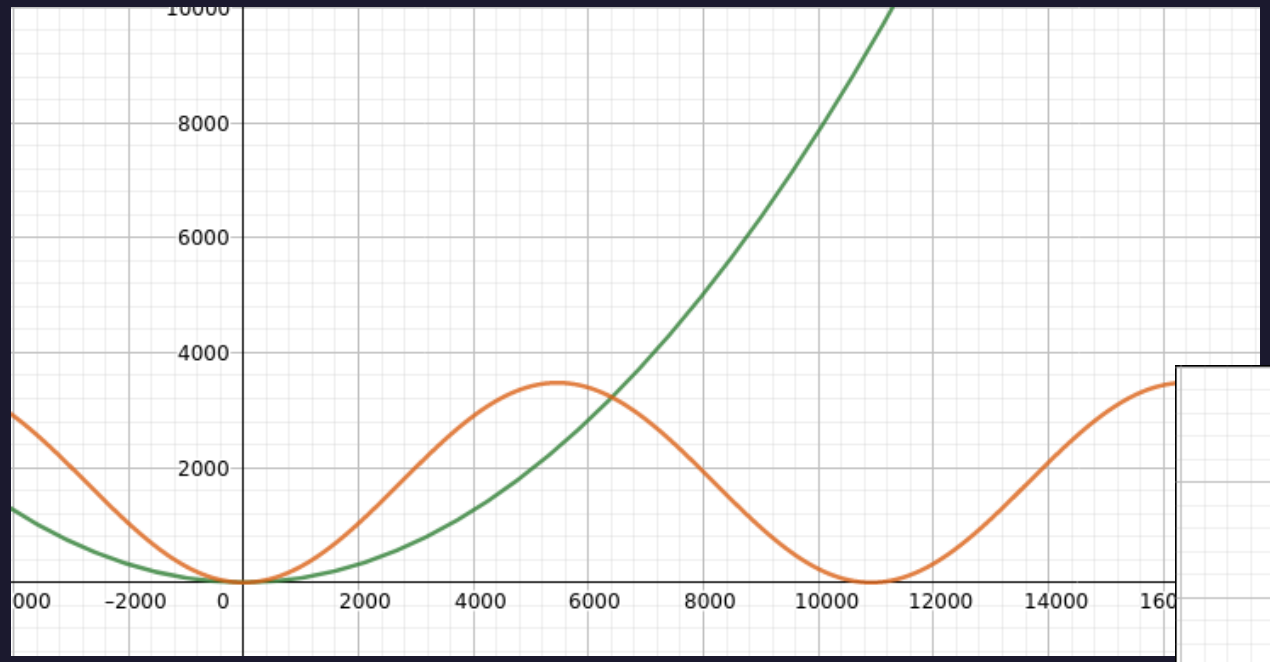
26000
28

What about elsewhere?



The moon

Jupiter