G-SRT Ask the Pilot

Task

In the July 2013 issue of United Airlines' Hemisphere Magazine the following article appeared:

ASK THE PILOT

With Captain Mike Bowers

Q: When you are flying at 35,000 feet, how far can we see on a clear day? What about at 40,000? At 30,000?

A: There are many factors that affect the visible distance to the horizon, including the curvature of the earth and the effects of atmospheric refraction. To simplify the answer: if we only consider the earth's curvature, the formula for distance in miles is 1.22 x the square root of the height of the aircraft in feet. I won't make you do the math: At 10,000 feet, you can see 122 miles. At 30,000 feet, visibility can be 211 miles; at 40,000 feet, you can see 244 miles. Of course, if you look "above" the horizon, you can see the sun at 93,000,000 miles and light years to the stars.

a. Write down an equation that describes Captain Bowers' method.

b. Create your own mathematical model to find the distance to the horizon from a plane.

c. Compare the two models. What simplifying assumptions did Captain Bowers make to create his model? Are these assumptions justified?