

Problem 1

Earth is approximately a sphere of radius 6.37×10^6 m. What are (a) its circumference in kilometers, (b) its surface area in square kilometers, and (c) its volume in cubic kilometers?

Solution

Let R represent the radius: $R = 6.37 \times 10^6$ m. Since all the answers need to be in kilometers, convert R to kilometers.

$$R = 6.37 \times 10^6 \text{ m} \times \frac{1 \text{ km}}{1000 \text{ m}} = 6.37 \times 10^3 \text{ km}$$

Therefore,

$$\text{Circumference : } 2\pi R = 2\pi(6.37 \times 10^3 \text{ km}) \approx 4.00 \times 10^4 \text{ km}$$

$$\text{Surface Area : } 4\pi R^2 = 4\pi(6.37 \times 10^3 \text{ km})^2 \approx 5.10 \times 10^8 \text{ km}^2$$

$$\text{Volume : } \frac{4}{3}\pi R^3 = \frac{4}{3}\pi(6.37 \times 10^3 \text{ km})^3 \approx 1.08 \times 10^{12} \text{ km}^3.$$