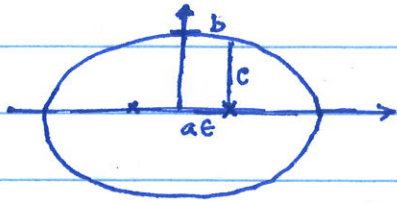


8-24)



Given: $a(1-e) = R_E + 300 \text{ km} = 6670 \text{ km}$
 $a(1+e) = R_E + 3500 \text{ km} = 9870 \text{ km}$

Thus, $a = \frac{6670 + 9870}{2} = 8270 \text{ km}$

and $e = \frac{3200 \text{ km}}{2a} = 0.19347$

The question asks for $c - R_E$ and for $\sqrt{b^2 + a^2e^2} - R_E$.

(a)
$$r = \frac{a}{1 + e \cos \theta} = \frac{a(1 - e^2)}{1 + e \cos \theta} = \frac{b\sqrt{1 - e^2}}{1 + e \cos \theta}$$

for $\theta = 90^\circ$, $r = b\sqrt{1 - e^2} = a(1 - e^2) = 7960.45 \text{ km}$

which is 1590 km above earth's surface.

(b) Here $r = \sqrt{b^2 + a^2e^2} = \sqrt{a^2 - a^2e^2 + a^2e^2} = a$

which is $8270 \text{ km} - 6370 \text{ km} = 1900 \text{ km}$ above earth's surface.