

Planet Holloway - Websheet 7.3

Physics Chapter 7

You may print this out and write on it or work on your own paper.

Show all work.

1. If a planet has 4 times the radius of Earth, but the same density, what is the gravitational acceleration at the surface?
2. Somewhere between the Earth and Planet Holloway is a point where the net gravitational force from both planets is zero. If Planet Holloway is $1/16$ the mass of Earth, what fraction of the way from Earth to Planet Holloway is the “zero g” spot located?
3. If a volcano on Planet Holloway launches lava up 20 Km above the surface, what is the initial speed of the lava if the gravitational field strength is 4 m/s^2 at the surface?
4. A stray asteroid has a perihelion of 2 AU and a period of revolution of 16 years. What is its greatest distance from the sun (it’s aphelion)?
5. Two satellites are monitored as they orbit Earth; satellite X is 3 times as far from the center of the Earth as is satellite Y. What is the period of revolution of satellite X in terms of the period for satellite Y?
6. A satellite in geosynchronous orbit $4.2 \times 10^7 \text{ m}$ above the center of the Earth has what force acting on it if it has a mass of 500 kg?

Answers:

1. 39.2 m/s/s

2. 4/5 the way to Planet Holloway

3. approximately 400 m/s

4. 10.7 AU

5. $T_x = 5.2 T_y$

6. 113.4 N