

Name: _____ Date: _____ Period: _____

Universal Gravitation and Circular Motion Practice

Universal Gravitation:

- 1) Two spherical objects have masses of 200 kg and 500 kg. Their centers are separated by a distance of 25 m. Find the gravitational attraction between them.

- 2) Two spherical objects have masses of 1.5×10^5 kg and 8.5×10^2 kg. Their centers are separated by a distance of 2500 m. Find the gravitational attraction between them

- 3) Two spherical objects have masses of 3.1×10^5 kg and 6.5×10^3 kg. The gravitational attraction between them is 65 N. How far apart are their centers?

- 4) Two spherical objects have masses of 8000 kg and 1500 kg. Their centers are separated by a distance of 1.5 m. Find the gravitational attraction between them.

- 5) Two spherical objects have masses of 8.1×10^2 kg and 4.5×10^8 kg. The gravitational attraction between them is 1.9×10^{-3} N. How far apart are their centers?

Circular Motion

1. A truck goes around a curve at 20 m/s. The radius of the curve is 50 m. Calculate the centripetal acceleration of the truck.

2. What is the centripetal force acting on a 1.5 kg mass moving in a circular path with a centripetal acceleration of 18 m/s^2 ?

3. A race car makes one lap around a race track of radius 50 meters in 9 seconds.

a. What was the car's magnitude of velocity?

b. What was the car's magnitude of acceleration?

4. An athlete whirls a 7 kg hammer tied to the end of a 1.3 m long chain in a horizontal circle. The hammer makes one revolution in 1 s.

What is the tangential velocity of the hammer?

What is the centripetal force acting on the hammer?

5. A student swings a 0.5 kg rubber ball attached to a string over her head in a horizontal, circular path. The string is 1.5 meters long and in 60 seconds the ball makes 120 complete circles.

a. What is the velocity of the ball?

b. What is the ball's centripetal acceleration?

c. What is the ball's centripetal force?