Introduction to Centripetal Force (formula practice)

$$F_c = \frac{mv^2}{r}$$

1. How much centripetal force is required to spin a 4.0kg mass at a velocity of 2 m/s with a radius of 8m? (2N)
2. How much centripetal force is required to spin a 14.0 kg mass at a velocity of 3.00 m/s with a radius of 4.00 m? (31.5N)

$$F_c = \frac{4\pi^2 mr}{T^2}$$

3. Determine the centripetal force that it would take to spin a 5.0 kg mass around a radius of 4.0 m with a period of 3.0s. (88 N)
4. Determine the centripetal force that it would take to spin a 10kg mass around a radius of 2.0m with a period of 6.0s. (22N)
5. Determine the centripetal force that it would take to spin a 70.0kg mass around a radius of 6.00m with a period of 8.00s. (259N).

$$F_c = 4\pi^2 mrf^2$$

6. If a mass of 2.000kg is spun in a circle with radius 3.000 m at a frequency of 4.000 Hz, calculate the centripetal force needed. (3790N).
7. If a mass of 6.00kg is spun in a circle of radius 2.00 m at a frequency of 3.00 Hz, calculate the centripetal force needed. (4260N).
8. If a mass of 80kg is spun in a circle with radius of 5.0 m at a frequency of 2.0 Hz, calculate the centripetal force needed. (6.3×10^4N)

$$M = \frac{4\pi^2 r^3}{GT^2} \qquad G = 6.67x10^{-11}\ Nm^2/kg^2$$

9. Determine the mass of a planet if one of its moons orbits at a radius of 6×10^8m and has a period of 4×10^5s. (8×10^{26}kg)
10. Determine the mass of a planet if one of its moons orbits at a radius of 5.0×10^7 m and has a period of 3.0×10^4s. (8.2×10^{25} kg).

$$v = \sqrt{\frac{GM}{r}}$$

11. How fast would a object have to rotate around a planet (mass of the planet = 6.0×10^{24} kg) if its radius of orbit was 6.4×10^6 m? (7900 m/s)
12. How fast would an object have to rotate around a planet (mass of planet = 4.0×10^{22} kg) if its radius of orbit is 3.0×10^5m? (3.0×10^3 m/s)