**Mock Gravity and Circular Motion Test**

**1. Random centripetal force questions:**

A. A 145 gram roll of masking tape completes an 89 cm radius circle in 0.34 seconds. What centripetal Force? (44.1 N)

B. A Porsche can do .94 “g”s of lateral acceleration. What maximum velocity around a 314 m radius corner? (53.8 m/s)

C. A 2.7 kg hammer goes in a circle with a speed of 12.0 m/s. This requires a force of 380 N. What is the radius? (1.02 m)

**2. A 1120 kg car goes around a flat corner with a radius of 280 m at a maximum speed of 47 m/s before sliding out.**

A. What is the centripetal acceleration of the car? (7.89 m/s/s)

B. What is the centripetal force needed at this speed? (8840 N)

C. What must be the coefficient of friction between the tires and the road? (.81)

**3. A 3.78x1025 kg planet has a 5.89x1022 kg moon in orbit 4.9x108 m from its center.**

A. What is the force of gravity between the moon and the planet? (6.19x1020 N)

B. What is the orbital speed of the moon? (2270 m/s)

C. What is the acceleration of the moon? (0.0105 m/s/s)

**4. RED ELK orbits planet Zirkon at a speed of 4230 m/s in his 11,250 kg ship 8.82x106 m from the center of the planet.**

A. What is the period of his orbit in hours? (3.64 Hrs)

B. What is the centripetal acceleration of his ship? (2.03 m/s/s)

C. What is the mass of planet Zirkon? (2.37x1024 kg)

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**Hey – here’s an idea. Write these down and actually do them. THIS IS JUST LIKE ONE OF THE FOUR THAT IS ON THE TEST! If you can’t do this on your own, you need to find someone in class today that can help you.**

**3. A 3.78x1025 kg planet has a 5.89x1022 kg moon in orbit 4.9x108 m from its center.**

A. What is the force of gravity between the moon and the planet? (6.19x1020 N)

B. What is the orbital speed of the moon? (2270 m/s)

C. What is the acceleration of the moon? (0.0105 m/s/s)

D. What is the force of gravity between an 8 kg bowling ball and the 130 kg person that is bowling it? (Their centers are 1.78 m apart) (2.19x10-8 N)

E. If you spin a bucket of water upside down in a vertical circle with a 1.15 m radius, what is the minimum speed it can have at the top such that the water stays in the bucket? (3.36 m/s)

**Bring a calculator that you know how to use, and write on your cheat sheet how to type in the complex things we have gone over in class.**