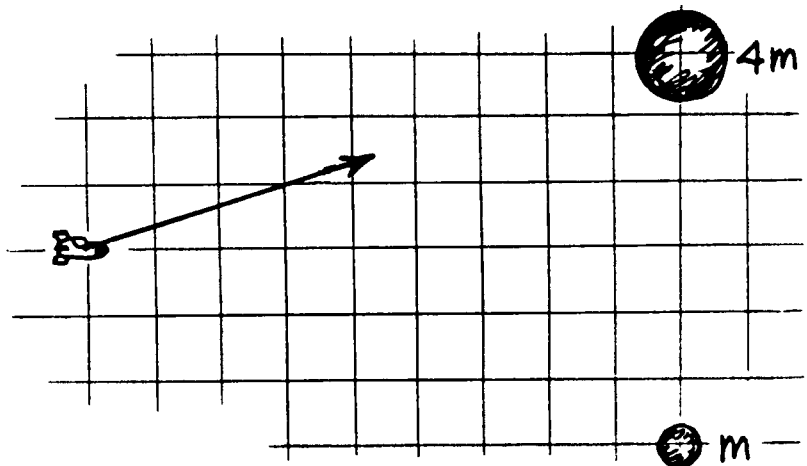


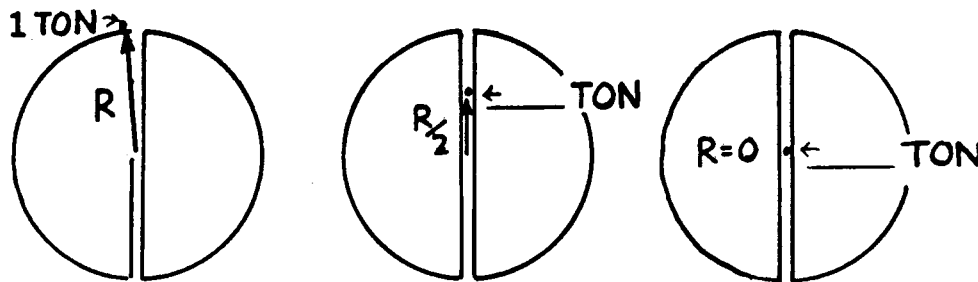


3. The spaceship is attracted to both the planet and the planet's moon. The planet has four times the mass of its moon. The force of attraction of the spaceship to the planet is shown by the vector.



- a. Carefully sketch another vector to show the spaceship's attraction to the moon. Then use the parallelogram method of Chapter 6 and sketch the resultant force.
- b. Determine the location between the planet and its moon (along the dotted line) where gravitational forces cancel. Make a sketch of the spaceship there.
4. Consider a planet of uniform density that has a straight tunnel from the north pole through the center to the south pole. At the surface of the planet, an object weighs 1 ton.

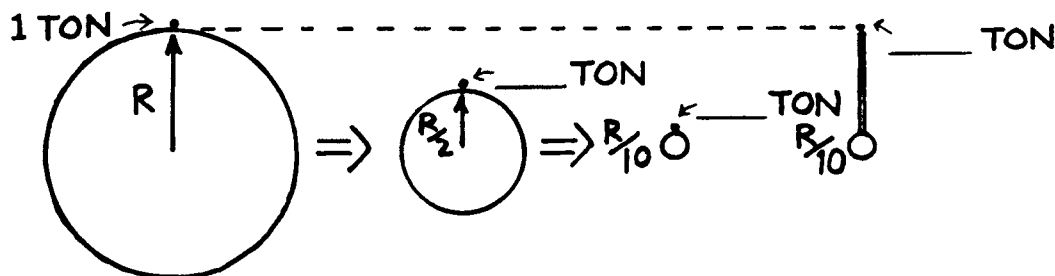
- a. Fill in the gravitational force on the object when it is half way to the center, then at the center.



- b. Describe the motion you would experience if you fell into the tunnel.
- 

5. Consider an object that weighs 1 ton at the surface of a planet, just before the planet gravitationally collapses. (The mass of the planet remains the same during collapse.)

- a. Fill in the weights of the object on the planet's shrinking surface at the radial values shown.



- b. When the planet has collapsed to 1/10 of its initial radius, a ladder is erected that puts the object as far from its center as the object was originally. Fill in its weight at this position.