



Science Virtual Learning

MPI Physics

Gravity 7: Homework for Mastery

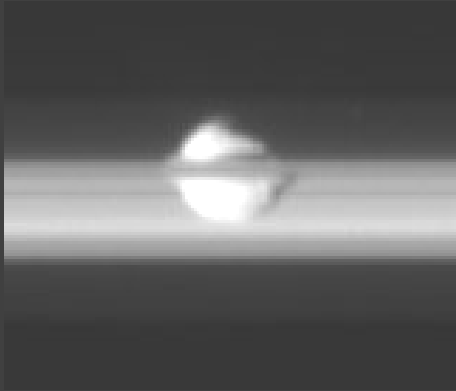
April 21, 2020



Lesson: MPI Gravity 7 - Homework for Mastery
April 21, 2020

**Objective: To practice calculating gravitational forces,
accelerations, and orbits**

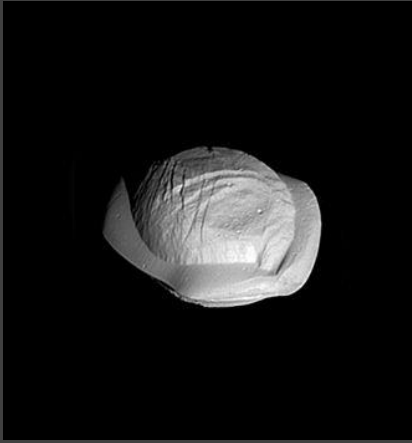
Homework 1



Pan is a moon of Saturn, located inside Saturn's rings. It has a radius of 14,100 m and a mass of $4.95 \cdot 10^{15}$ kg. What is the acceleration due to gravity on Pan's surface? How much would a 72.0-kg person weigh on Pan's surface?

- Try to solve the problem yourself, then watch the solution video:
- <https://youtu.be/5GkzkytcWew>

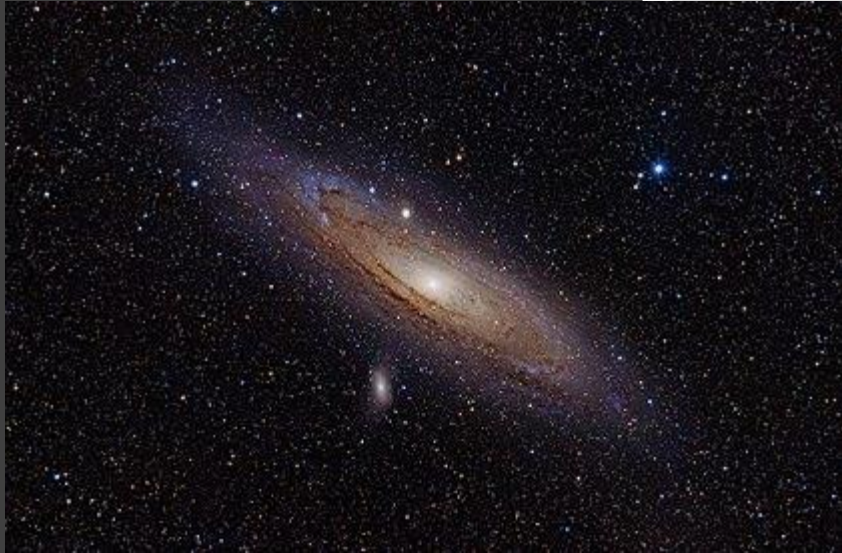
Homework 2



Pan orbits Saturn (mass = $5.68 \cdot 10^{26}$ kg) at a distance of $1.34 \cdot 10^8$ m. How fast does it move? How much time does it take to orbit Saturn?

- Try to solve the problem yourself, then watch the solution video:
- <https://youtu.be/r5NdRMEbyCc>

Homework 3



The Andromeda galaxy is the next big neighbor to our galaxy, the Milky Way. Both have a mass of about $2.50 \cdot 10^{42}$ kg, and are $2.57 \cdot 10^6$ light-years apart (1 light-year = $9.46 \cdot 10^{15}$ m). Calculate the force of gravity between the galaxies. Calculate the acceleration of the Andromeda galaxy toward us caused by this force. (The galaxies are expected to collide in about 4.5 billion years.)

- Try to solve the problem yourself, then watch the solution video:
- <https://youtu.be/fgsoqumNnrk>

Homework 4



Triton is a moon of Neptune, and orbits at a distance of $3.56 \cdot 10^8$ m. Neptune's mass is $1.03 \cdot 10^{26}$ kg. What is Triton's period?

- Try to solve the problem yourself, then watch the solution video:
- <https://youtu.be/ox-tni0keZE>



That's it!

