

This print-out should have 6 questions. Multiple-choice questions may continue on the next column or page – find all choices before answering.

Quick Weight Loss

001 10.0 points

How high does a rocket have to go above the Earth's surface so that its weight is reduced to 54.4% of its weight at the Earth's surface? The radius of the Earth is 6380 km and the universal gravitational constant is $6.67 \times 10^{-11} \text{ N} \cdot \text{m}^2/\text{kg}^2$.

Correct answer: 2270.1 km.

Apollo Astronauts

002 (part 1 of 2) 10.0 points

On the way to the moon, the Apollo astronauts reach a point where the Moon's gravitational pull is stronger than that of Earth's.

Find the distance of this point from the center of the Earth. The masses of the Earth and the Moon are $5.98 \times 10^{24} \text{ kg}$ and $7.36 \times 10^{22} \text{ kg}$, respectively, and the distance from the Earth to the Moon is $3.84 \times 10^8 \text{ m}$.

Correct answer: $3.45653 \times 10^8 \text{ m}$.

003 (part 2 of 2) 10.0 points

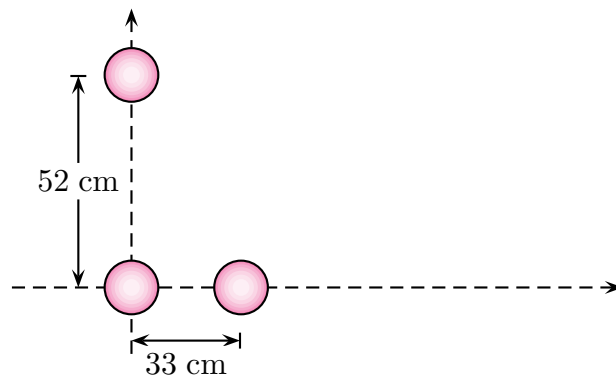
What is the acceleration due to the Earth's gravity at this point? The value of the universal gravitational constant is $6.672 \times 10^{-11} \text{ N} \cdot \text{m}^2/\text{kg}^2$.

Correct answer: 0.00333946 m/s^2 .

Gravitational Attraction 04

004 (part 1 of 2) 10.0 points

Three 5 kg masses are located at points in the xy plane as shown.



What is the magnitude of the resultant force (caused by the other two masses) on the mass at the origin? The universal gravitational constant is $6.6726 \times 10^{-11} \text{ N} \cdot \text{m}^2/\text{kg}^2$.

Correct answer: $1.65138 \times 10^{-8} \text{ N}$.

005 (part 2 of 2) 10.0 points

At what angle from the positive x -axis will the resultant force point? Let counterclockwise be positive, within the limits -180° to 180° .

Correct answer: 21.9365° .

Gravity on Planet X short

006 10.0 points

Planet X has a mass 6.41 times that of the Earth and a radius 3.73 times the radius of the Earth.

What is the acceleration due to gravity on the surface of Planet X, measured in units of g (the gravitational acceleration on the surface of the Earth)?

Correct answer: $0.460724 g$.