

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

Moon Orbit

001 (part 1 of 2) 10.0 points

The orbit of a Moon about its planet is approximately circular, with a mean radius of 3.62×10^8 m. It takes 23.3 days for the Moon to complete one revolution about the planet.

Find the mean orbital speed of the Moon.

Correct answer: 1129.84 m/s.

002 (part 2 of 2) 10.0 points

Find the Moon's centripetal acceleration.

Correct answer: 0.00352638 m/s².

Artificial Gravity

003 10.0 points

A space station in the form of a large wheel, 160 m in diameter, rotates to provide an “*artificial gravity*” of 3.8 m/s² for people located at the outer rim.

What is the frequency of the rotational motion for the wheel to produce this effect?

Correct answer: 2.08122 rev/min.

Serway CP 03 40

004 (part 1 of 2) 10.0 points

The pilot of an aircraft wishes to fly due west in a 72 km/h wind blowing toward the south. The speed of the aircraft relative to the air is 220 km/h.

In what direction should the aircraft head?

Answer in degrees from due East, with counterclockwise positive, within the limits of -180° to 180° .

Correct answer: 160.897°.

005 (part 2 of 2) 10.0 points

What will be its speed relative to the ground?

Correct answer: 207.885 km/h.

Holt SF 03Rev 50

006 10.0 points

A hunter wishes to cross a river that is 1.6 km wide and that flows with a speed of 7 km/h. The hunter uses a small powerboat that moves at a maximum speed of 15 km/h with respect to the water.

What is the time necessary for crossing if the boat goes directly across the river?

Correct answer: 7.23627 min.