

Homework #3

Name: [Leslie Looney \(Preview\)](#)

Number of Questions: 20

Finish

Help

Question 1: (5 points)

Which of the following statements CORRECTLY states the significance of Galileo's observation that Venus shows phases?

- ☐ 1. The phases showed that, like the Moon, Venus is always much closer to the Earth than the Sun is.
- ☒ 2. The phases were correlated with angular size in a way that supported the heliocentric theory.
- ☐ 3. The phases were interesting, but did not have any other particular significance.
- ☐ 4. Because the phases were NOT correlated with angular size, they actually supported the geocentric theory more than the heliocentric theory.

Save answer

Question 2: (5 points)

A distant asteroid is discovered which takes 50 years to orbit the Sun once. According to Kepler's third law, what is the average distance of this asteroid from the Sun?

- ☐ 1. 2500 AU.
- ☐ 2. 50 AU.
- ☐ 3. 353 AU (square root of 125,000).
- ☒ 4. 13.6 AU (cube root of 2500).

Save answer

Question 3: (5 points)

What was the MOST IMPORTANT difference between the development of Isaac Newton's theory of planetary motion and that of Johannes Kepler?

- ☒ 1. Newton developed his theory from basic physical assumptions, whereas Kepler simply adjusted his theory to fit the data.
- ☐ 2. Newton lived in England, which is famous for clear skies, whereas Kepler lived on the

- ☐ Continent, which is notorious for bad weather.
- ☐ 3. Newton based his theory on accurate telescopic observations, whereas Kepler used observations made by eye.
- ☐ 4. Newton lived in a freer political climate, whereas Kepler risked house arrest if his theory opposed the Bible or Aristotle.

Save answer

Question 4: (5 points)

In which direction would the Earth move if the Sun's gravitational force were suddenly removed from it?

- ☐ 1. In a straight line toward the Sun.
- ☐ 2. Continue in a circular orbit, because of its spin.
- ☐ 3. In a straight line directly away from the Sun.
- ☒ 4. In a straight line along a tangent to its circular orbit.

Save answer

Question 5: (5 points)

How many forces need to be applied to a body in space in order to keep it moving with a constant velocity?

- ☒ 1. None.
- ☐ 2. One force, in a direction opposite to the direction of motion.
- ☐ 3. Two unequal forces.
- ☐ 4. One force, in the direction of motion.

Save answer

Question 6: (5 points)

The acceleration of an object is defined as

- ☐ 1. the rate of changes of its speed.
- ☒ 2. the rate of change of its velocity.
- ☐ 3. the rate of change of its direction of travel.
- ☐ 4. the rate of change of its position.

☐

Save answer

Question 7: (5 points)

Which of the following four objects or persons is NOT accelerating? (Careful!)

- ☐ 1. A bicyclist gradually slowing down on a straight road while coasting toward a stop sign.
- ☐ 2. A motorcyclist travelling around a circular racetrack at a constant speed.
- ☐ 3. An apple falling to the ground from an apple tree.
- ☒ 4. An Olympic swimmer exerting considerable force to maintain a constant speed in a straight line through the water.

Save answer

Question 8: (5 points)

Newton stated that a constant force, continuously applied to a body in space, will give it

- ☐ 1. a constant velocity.
- ☒ 2. a constant acceleration.
- ☐ 3. a change of position from one state of rest to another state of rest.
- ☐ 4. a headache.

Save answer

Question 9: (5 points)

Two spaceships that have different masses but rocket engines of identical force are at rest in space. If they fire their rockets at the same time, which ship will speed up faster?

- ☒ 1. The one with the lower mass.
- ☐ 2. The one with the higher mass.
- ☐ 3. They will increase speed at the same rate, because they have identical rocket engines.
- ☐ 4. They will not speed up at all, but move at a constant speed because they are in space and the rocket has nothing against which to push.

Save answer

Question 10: (5 points)

A diver weighing 138 pounds has just dived up and out from the high board and is doing a back flip before starting to descend toward the water. How much force does the diver exert on the Earth while doing the back flip?

- ☐ 1. Much more than 138 pounds, because the Earth is so much more massive than the diver.
- ☐ 2. Zero.
- ☐ 3. Much less than 138 pounds (but more than zero), because the diver has so much less mass than the Earth.
- ☒ 4. 138 pounds.

Save answer

Question 11: (5 points)

The strength of gravity on Mars is about 40% of that on the Earth. If you were to visit Mars, what would happen to your mass and weight compared to when you were on Earth?

- ☐ 1. Your weight would be the same but your mass would be less.
- ☐ 2. Your weight and mass would both be less than when you were on Earth.
- ☒ 3. Your mass would be the same but your weight would be less.
- ☐ 4. Your weight and mass would both be unchanged from when you were on Earth.

Save answer

Question 12: (5 points)

Suppose that a planet of the same mass as the Earth were orbiting the Sun at a distance of 10 AU. The gravitational force on this planet due to the Sun would be

- ☒ 1. 1/100 of that which the Sun exerts on the Earth.
- ☐ 2. 100 times that which the Sun exerts on the Earth.
- ☐ 3. 1/10 of that which the Sun exerts on the Earth.
- ☐ 4. 10 times that which the Sun exerts on the Earth.

Save answer

Question 13: (5 points)

Suppose that a planet of 10 times the mass of the Earth were orbiting the Sun at the same distance as the Earth (1 AU). The gravitational force on this planet due to the Sun would be

- ☐ 1. 1/100 of that on the Earth due to the Sun.
- ☐ 2. 100 times that on the Earth due to the Sun.
- ☐ 3. 1/10 of that on the Earth due to the Sun.
- ☒ 4. 10 times that on the Earth due to the Sun.

Save answer

Question 14: (5 points)

How much gravitational force acts on an astronaut in the Space Shuttle in a circular orbit 300 km above the Earth's surface?

- ☐ 1. Zero—the astronaut is weightless.
- ☐ 2. Almost zero, but not quite.
- ☐ 3. Exactly the same as when the astronaut is standing on the surface of the Earth.
- ☒ 4. Almost (but not quite) as much as when the astronaut is standing on the surface of the Earth.

Save answer

Question 15: (5 points)

How was the planet Neptune discovered?

- ☒ 1. By mathematical prediction using Newton's laws.
- ☐ 2. It happened to pass close to Jupiter in the sky and was discovered by an astronomer studying Jupiter.
- ☐ 3. Accidentally during a telescopic survey of the sky.
- ☐ 4. No one knows—it has been known since ancient times.

Save answer

Question 16: (5 points)

You are driving to your Astro100 class that is 10 km away from your home. At times, your speedometer reads as high as 60 km/hr, but there are a number of stop signs. It takes you 30 minutes to get to class. Your average speed was

- ☐ 1. 60 km/hr
- ☒ 2. 20 km/hr
- ☐ 3. 30 km/hr
- ☐ 4. 10 km/hr

Save answer

Question 17: (5 points)

As seen in the Moon movies shown in class, on the moon

- ☐ 1. There is no gravity
- ☐ 2. There was a rich and ancient culture
- ☒ 3. The Law of gravity still applies
- ☐ 4. The Astronauts found large lakes called Mares

Save answer

Question 18: (5 points)

An astronaut in space moves an anvil. He has

- ☒ 1. to struggle to push it into motion
- ☐ 2. an easy time moving it due to the lower gravity
- ☐ 3. to not be wearing magnetic boots to push it
- ☐ 4. to push it twice as hard in order not to move away from the anvil with a higher acceleration

Save answer

Question 19: (5 points)

If you normally weighed 100 pounds on Earth, what would you weigh on Quaoar, which is 1/10 of the Earth's radius and 0.01 the Earth's mass?

- ☐ 1. 0.1 pound
- ☐ 2. 10 pound
- ☒ 3. 100 pound
- ☐ 4. 1000 pound

Save answer

Question 20: (5 points)

If you look at the orbits of all of the solar systems objects, you will notice

- ☐ 1. That all of the planets except Pluto orbit clockwise
- ☒ 2. That all the bodies orbit the Sun counterclockwise
- ☐ 3. All the planets but none of the comets orbit clounterclockwise.
- ☐ 4. The the motion of the bodies are random.

Save answer

Finish

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