

#9 Circular Motion Post-class

Due: 11:00am on Wednesday, September 12, 2012

Note: *You will receive no credit for late submissions.* To learn more, read your instructor's [Grading Policy](#)

Exercise 3.34

The Ferris wheel in the figure, which rotates counterclockwise, is just starting up. At a given instant, a passenger on the rim of the wheel and passing through the lowest point of his circular motion is moving at 3.00 m/s and is gaining speed at a rate of 0.500 m/s^2 .



Part A

Find the magnitude of the passenger's acceleration at this instant.

ANSWER:

$$a = 0.814 \text{ m/s}^2$$

Correct

Part B

Find the direction of the passenger's acceleration at this instant.

ANSWER:

$$\theta = 37.9^\circ \text{ to the right of vertical}$$

Correct

Exercise 3.29

The earth has a radius of 6380 **km** and turns around once on its axis in 24 **h**.

Part A

What is the radial acceleration of an object at the earth's equator? Give your answer in m/s^2 .

ANSWER:

$$a_{\text{rad}} = 3.40 \times 10^{-2} \text{ m/s}^2$$

Correct

Part B

What is the radial acceleration of an object at the earth's equator? Give your answer as a fraction of g .

ANSWER:

$$a_{\text{rad}} = 3.40 \times 10^{-3} g$$

Correct

Part C

If a_{rad} at the equator is greater than g , objects would fly off the earth's surface and into space. What would the period of the earth's rotation have to be for this to occur?

ANSWER:

$$T = 5070 \text{ s}$$

Correct

Exercise 3.31

In a test of a " g -suit," a volunteer is rotated in a horizontal circle of radius 7.2m .

Part A

What must the period of rotation be so that the centripetal acceleration has a magnitude of $2.0g$?

Express your answer using two significant figures.

ANSWER:

$$T_1 = 3.8 \text{ s}$$

Correct

Part B

What must the period of rotation be so that the centripetal acceleration has a magnitude of $12g$?

Express your answer using two significant figures.

ANSWER:

$$T_2 = 1.6 \text{ s}$$

Correct

Score Summary:

Your score on this assignment is 98.2%.

You received 29.45 out of a possible total of 30 points.