

Vertical Circle Questions from A5.2

Use the convention that up is positive. For all the forces, label them "up" or "down"

<p>-0.60 "g"s 1.60 "g"s 8.51 N (up) 95.5 N (up) 7.84 s 38.7 N (up)</p>	<p>1. a. A carnival ride moves at a constant speed in a vertical circle. If the riders are feeling 2.60 "g"s at the bottom, what "g"s do they feel at the top, and what is the actual centripetal acceleration of the ride in "g"s? (Be sure to answer both questions) b-c: A 5.30 kg mass moves at a constant speed in a vertical circle on the end of a 0.440 m long rod with a velocity of 1.90 m/s. b. What force in what direction does the rod exert at the top? c. What force in what direction does the rod exert at the bottom? d-e: A 2.60 kg mass moves at a constant speed in a 7.90 m radius vertical circle on the end of a rod. At the top this requires an <u>upward</u> force of 12.3 N. d. What is the period of the mass? e. What force in what direction is required at the bottom?</p>
<p>0.88 "g"s 1.12 "g"s -7.14 N (down) 42.5 N (up) 3.78 m/s 2.09 N (up)</p>	<p>2. a. A carnival ride moves at a constant speed in a vertical circle. If the actual centripetal acceleration of the ride in "g"s is 0.12 "g"s, what "g"s do the riders feel at the top, what "g"s do they feel at the bottom? (Be sure to answer both questions) b-c: A 1.80 kg mass moves in a vertical circle at a constant speed with a period of 3.30 s on the end of a 3.80 m long rod. b. What force in what direction does the rod exert at the top? c. What force in what direction does the rod exert at the bottom? d-e: A 2.40 kg mass moves in a vertical circle at a constant speed on the end of a 1.60 m long rod. At the bottom this requires an <u>upward</u> force of 45.0 N d. What is the speed of the mass? e. What force in what direction is required at the top?</p>
<p>2.31 "g"s 1.31 "g"s 9.43 N (up) 31.8 N (up) 2.89 s -2.46 N (down)</p>	<p>3. a. A carnival ride moves at a constant speed in a vertical circle. If the riders are feeling 0.31 "g"s inverted at the top, what "g"s do they feel at the bottom, and what is the actual centripetal acceleration of the ride in "g"s? (Be sure to answer both questions) b-c: A 2.10 kg mass moves at a constant speed in a vertical circle on the end of a 0.910 m long rod at 2.20 m/s. b. What force in what direction does the rod exert at the top? c. What force in what direction does the rod exert at the bottom? d-e: A 1.20 kg mass moves at a constant speed in a vertical circle on the end of a 2.50 m long rod. This requires 26.0 N of <u>upward</u> force at the bottom. d. What is the period of the mass? e. What force in what direction is required at the top?</p>
<p>0.62 "g"s 1.62 "g"s 0.794 N (up) 28.6 N (up) 2.12 s 25.1 N</p>	<p>4. a. A carnival ride moves at a constant speed in a vertical circle. If the riders feel 0.38 "g"s at the top, what is the centripetal acceleration of the ride in "g"s, and what "g"s do they feel at the bottom (Be sure to answer both questions) b-c: A 1.50 kg mass moves at a constant speed of 2.30 m/s in a vertical circle with a radius of 0.570 m on the end of a rod. b. What force in what direction does the rod exert at the top? c. What force in what direction does the rod exert at the bottom? d-e: A 1.60 kg mass moves at a constant speed in a 0.670 m radius circle on the end of a rod. At the top this requires an <u>upward</u> force of 6.30 N. d. What is the period of motion of the mass? e. What force in what direction is required at the bottom?</p>
<p>-1.34 "g"s 2.34 "g"s -15.4 N (down) 42.9 N (up) 2.90 m/s 50.0 N (up)</p>	<p>5. a. A carnival ride moves at a constant speed in a vertical circle. If the riders are feeling 3.34 "g"s at the bottom, what "g"s do they feel at the top, and what is the actual centripetal acceleration of the ride in "g"s? (Be sure to answer both questions) b-c: A 1.40 kg mass moves in a vertical circle at a constant speed on the end of a 0.760 m long rod with a period of 1.20 s. b. What force in what direction does the rod exert at the top? c. What force in what direction does the rod exert at the bottom? d-e: A 2.20 kg mass moves in a vertical circle on the end of a rod with a radius of 0.650 m. At the top this requires a <u>downward</u> force of 6.80 N. d. What is the velocity of the mass? e. What force in what direction is required at the bottom?</p>