Practice 7.2

1. a. A very clever Physics teacher twirls a bucket in a 1.50 m radius vertical circle at a constant speed. What is the maximum period the motion can have for the water to stay in the bucket? (2.46 s)

b. A Ferris wheel has an acceleration of 0.210 "g"s. What do the riders feel at the top and at the bottom? (0.790 "g"s top, 1.210 "g"s bottom)

c. Riders on a Ferris wheel measure 1.200 "g"s at the bottom of the ride. What "g"s do the riders feel and measure at the top, and how many "g"s is the ride really pulling? What is the acceleration of the ride in m/s/s? (0.800 "g"s, 0.200 "g"s, 1.96 m/s/s)

d. A Ferris wheel has a radius of 7.80 m, and a period of 9.00 s. What "g" force do they read at the top and bottom of the ride? (0.612 "g"s, 1.388 "g"s)

e. A 3.10 m radius vertical circle ride that holds its riders upside down at the top makes riders feel 2.60 "g"s at the bottom of the ride. What is the tangential velocity of the ride? (6.97 m/s)

2. a. The Chuck wagon makes riders go in a 4.60 m radius vertical circle. What is the maximum period the motion can have for the riders to not fall off the ride when they turn upside down at the top? (4.30 s)

b. A Zero-G has an acceleration of 1.650 "g"s. What to the riders feel at the top and at the bottom? (-0.650 "g"s inverted top, 2.650 "g"s bottom)

c. A Ferris wheel is pulling 0.170 "g"s of centripetal acceleration. What "g"s do the riders feel and measure at the top and bottom of the ride? What is the acceleration of the ride in m/s/s? (0.830 "g"s, 1.170 "g"s, 1.67 m/s/s)

d. A vertical circle ride that holds its riders upside down at the top has a radius of 9.20 m, and a period of 4.60 s. What "g" force to the riders feel and measure at the top and at the bottom of the ride? (-0.751 "g"s (inverted), 2.751 "g"s)

e. Riders at the bottom of the Ferris wheel measure a "g" force of 1.320 "g"s. What is the tangential velocity of the ride if the radius is 7.50 m? (4.85 m/s)

3. a. The old Looping Thunder had 3.80 m radius inverting loop. What was the minimum tangential velocity at the top for the riders to stay on the ride without falling off? (6.10 m/s)

b. A Ferris wheel has an acceleration of 0.140 "g"s. What do the riders feel at the top and at the bottom? (0.860 "g"s top, 1.140 "g"s bottom)

c. Riders on a Ferris wheel measure 0.910 "g"s at the top of the ride. What "g"s do the riders feel and measure at the bottom, and how many "g"s is the ride really pulling? What is the acceleration of the ride in m/s/s? (1.090 "g"s. 0.090 "g"s, 0.882 m/s/s)

d. A Ferris wheel has a radius of 8.20 m, and a tangential velocity of 4.50 m/s. What "g" force do they read at the top and bottom of the ride? (0.748 "g"s, 1.252 "g"s)

e. A vertical circle ride that holds its riders upside down at the top has a radius of 5.30 m and generates an inverted "g" force of -0.420 "g"s at the top. What is the period of the ride? (3.88 s)

4. a. An airplane goes in a 112 m radius vertical circle (inside loop). What is the minimum velocity the plane can have for the pilot to stay in her seat without requiring a seatbelt? (33.1 m/s)

b. A Zero-G has an acceleration of 1.420 "g"s. What to the riders feel at the top and at the bottom? (-0.420 "g"s inverted top, 2.420 "g"s bottom)

c. Riders on a Ferris wheel measure 1.350 "g"s at the bottom of the ride. What "g"s do the riders feel and measure at the top, and how many "g"s is the ride really pulling? What is the acceleration of the ride in m/s/s? (0.650 "g"s, 0.350 "g"s, 3.43 m/s/s)

d. A vertical circle ride that holds its riders upside down at the top has a radius of 4.50 m, and a velocity of 9.70 m/s. What "g" force to the riders feel and measure at the top and at the bottom of the ride? (-1.134 "g"s (inverted), 3.134 "g"s)

e. Riders at the bottom of the Ferris wheel measure a "g" force of 1.120 "g"s. What is the period of the ride if the radius is 9.50 m? (17.9 s)

5. a. The Zero G has a radius of 4.30 m. What is the maximum period the ride can have to keep the riders from falling off the ride at the top when it is vertical? (4.16 s)

b. A Ferris wheel has an acceleration of 0.350 "g"s. What do the riders feel at the top and at the bottom? (0.650 "g"s top, 1.350 "g"s bottom)

c. A Ferris wheel is pulling 0.210 "g"s of centripetal acceleration. What "g"s do the riders feel and measure at the top and bottom of the ride? What is the acceleration of the ride in m/s/s? (0.790 "g"s, 1.210 "g"s, 2.06 m/s/s)

d. A Ferris wheel has a radius of 7.60 m, and a period of 11.50 s. What "g" force do they read at the top and bottom of the ride? (0.768 "g"s, 1.232 "g"s)

e. A vertical circle ride that holds its riders upside down at the top has a radius of 5.80 m and generates an inverted "g" force of -0.720 "g"s at the top. What is the tangential velocity of the ride? (9.89 m/s)