10 Circular Motion

Name_____

Worksheet: A DATE WITH CIRCULAR MOTION

Inquiry Physics

1. One Friday afternoon, Velma Velocity was on her way to Victor Vector's house when her 6.00×10^4 N automobile rounded a horizontal curve at 22.0 m/s. Ever the dedicated student, Velma estimated that the curve had a radius of 250 m and calculated the centripetal force of the road on her car. What value did she obtain?

2. Arriving at Victor's house, Velma found him flying a model airplane in a horizontal circle in his backyard. He told her the plane massed 500 grams and that the string he was holding the plane in a circle with was 6.00 meters long. The plane made 1.00 revolution every 4.00 seconds. Velma instantly told him the centripetal acceleration of the plane. What value did she give?

3. Victor, miffed at Velma showing him up, retaliated by stating the amount of tension in the string. What value did he give?

4. Velma had the last word by stating the **angular speed** of the plane. (She told Victor how many revolutions per second the plane had.) What value did she specify?

5. Victor and Velma later went to the laundromat (their date was a real washout). The laundry was equipped with washing machines that provided a constant centripetal force of 50.0 newtons. Somewhat bored, Velma calculated the speed of one 30.0 newton load of laundry during the spin cycle. If the washer tub had a radius of 0.300 meters, what value did she obtain?

6. The couple then went to a pizza parlor for dinner and ordered a "0.400 meter diameter pizza". When they received their order, Velma thought the pepperonis on it looked puny. Victor decided to weigh one by placing it on the outer edge of the pizza and spinning the plate. Using his wristwatch, he found that it took 5.00 seconds for it to revolve 4.00 times. The waitress, who was also a very good physics student, estimated from the distortion of the pizza that the centripetal force was 0.0250 newtons. How much did the pepperoni **weigh**?

7. Having finished their pizza, Victor and Velma decided to drop by and see Mr. M. They found him in his front yard, twirling a 1.20 kilogram kitten on a string. A closer look showed he was actually twirling a spring scale that had the string and then the kitten tied onto it. Mr. M reported he had been timing with his watch and found that when he twirled the kitten at a speed of 5.00 m/s, the scale read 30.0 N. Mr. M challenged the students to calculate the radius of the circle. What length did the intrepid Physics lovebirds come up with?