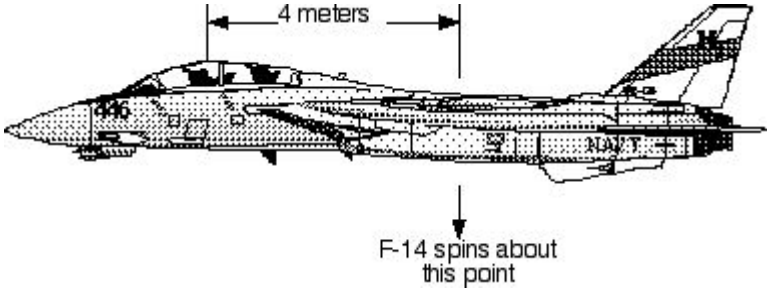
Name _____ Physics

Chapter 7.1 Circular Motion pair-Share Activity

Directions: Answer each of the following problems and show all work.

1. In the movie <u>Top Gun</u>, an F-14 fighter jet gets stuck in a flat spin. The jet rotates such that the pilot, 4 meters from the planes spin center, feels a centripetal force of 6 g's. There the pilots hand weighs 6 times as much as normal.



What is the centripetal acceleration of the pilot in m/s^2.

What is the period of motion of the pilot?

What is the tangential velocity of the pilot?

2. An ice skater spins with her hands stretched out from her body. Her hand is 1.12 meters from the axis that she is spinning along. Her hands are spinning at 5.74 ^{m}/s.

(A) What is the centripetal acceleration of her hand?

(B) How many g's is your answer in (A)?

(C) If her hand has a mass of 0.2 kg then what is the centripetal force acting on her hand?

D) How long does it take for her to spin around once?

3. Dog is chasing his tail. The radius of the circle that dog makes is 0.62 meters. The dog runs in a circle 10 times in 7.2 seconds.

a) What is the period of motion of the dog?

b) What is the speed of the dog?

c) What us the centripetal acceleration of the dog?

d) If the dog has a bandanna tied to his neck, mass is 0.024 kg, then what is the centripetal force acting on the bandanna?

4. A merry-go-round travels with a tangential speed of 3.5 ^{m}/s. Its diameter is 34 m across?

a) What is the centripetal acceleration of the merry-go-round?

b) How long does the merry-go-round take to go around once?

c) What is the centripetal force acting on a 45 kg rider 15 meters from the center of merry-go-round?