

Name: \_\_\_\_\_

### Angular Kinematics Practice

7D-1 What is the angular acceleration of a bicycle wheel if it rotates through 18.0 rad in 5.00 s if it starts with an initial angular velocity of 2.0 rad/s?

Ans:

7D-2 A diver performing a double somersault spins at an angular speed of  $4.0\pi$  rad/s precisely 0.50 seconds after leaving the platform. Assuming the diver begins with zero initial angular speed and accelerates at a constant rate, what is the diver's angular acceleration during the somersault?

Ans:

7D-3 A fish swimming behind an oil tanker gets caught in a whirlpool created by the ship's propellers. The fish has an angular speed of 1.0 rad/s. After 4.5 s, the fish's angular speed is 14.5 rad/s. If the water in the whirlpool accelerates at a constant rate, what is the angular acceleration?

Ans:

7D-4 A remote controlled car's wheel accelerates at  $22.4 \text{ rad/s}^2$ . If the wheel begins with an angular speed of 10.8 rad/s, what is the wheel's angular speed after exactly three full turns?

Ans:

7D-5 How long does the wheel in item 7D-4 take to make the three turns?

Ans:

7E-1 A woman passes through a revolving door with a tangential speed of 1.8 m/s. If she is 0.80 m from the center of the door, what is the door's angular speed?

Ans:

7E-2 A softball pitcher throws a ball with a tangential speed of 6.93 m/s. If the pitcher's arm is 0.660 m long, what is the angular speed of the ball before the pitcher releases it?

Ans:

7E-3 An athlete spins in a circle before releasing a discus with a tangential speed of 9.0 m/s. What is the angular speed of the spinning athlete? Assume the discus is 0.75 m from the athlete's axis of rotation.

Ans:

7E-4 Fill in the unknown quantities in the following table:

	$v_t$	$\omega$	$r$
<b>a.</b>		121.5 rad/s	0.030 m
<b>b.</b>	0.75 m/s		0.050 m
<b>c.</b>		1.2 rev/s	3.8 m
<b>d.</b>	$2.0\pi$ m/s	$1.5\pi$ rad/s	

7F-1 A dog on a merry-go-round undergoes a  $1.5 \text{ m/s}^2$  linear acceleration. If the merry-go-round's angular acceleration is  $1.0 \text{ rad/s}^2$ , how far is the dog from the axis of rotation?

Ans:

7F-2 A young boy swings a yo-yo horizontally above his head at an angular acceleration of  $0.35 \text{ rad/s}^2$ . If tangential acceleration of the yo-yo at the end of the string is  $0.18 \text{ m/s}^2$ , how long is the string?

Ans:

7F-3 What is a tire's angular acceleration if the tangential acceleration at a radius of  $0.15 \text{ m}$  is  $9.4 \times 10^{-2} \text{ m/s}^2$ ?

Ans: