Math 3 Name:_____

Unit 2.4 Linear and Angular Speed PRACTICE

Use the formula $\omega = \frac{\theta}{t}$ to find the value of the missing variable.

1) $\omega = \frac{2\pi}{3}$ radians per sec, t = 3 sec

2) $\omega = \frac{\pi}{4}$ radians per min, t = 5 min

3) $\theta = \frac{3\pi}{4}$ radians, t = 8 sec

4) $\theta = \frac{2\pi}{5}$ radians, t = 10 sec

5) $\theta = \frac{2\pi}{9}$ radians, $\omega = \frac{5\pi}{27}$ radians per min

6) $\theta = \frac{3\pi}{8}$ radians, $\omega = \frac{\pi}{24}$ radians per min

7) $\theta = 3.871142$, t = 21.4693 sec

8) $\omega = 0.90674$ radians per min, t = 11.876 min

Use the formula $v = r\omega$ to find the value of the missing variable.

9) $\omega = \frac{2\pi}{3}$ radians per sec, r = 12 m

10) $\omega = \frac{9\pi}{5}$ radians per min, r = 8 cm

11) v = 9 m per sec, r = 5 m

12) v = 18 ft per sec, r = 3 ft

13) v = 107.692 m per sec, r = 58.7413 m

14) ω = 0.372914 radian per sec, r = 24.93215 cm

The formula $\omega = \frac{\theta}{t}$ can be rewritten as $\theta = \omega t$. Using ωt for θ changes $s = r\theta$ to $s = r\omega t$.
Use the formula $s = r\omega t$ to find the value of the missing variable.

15) $\omega = \frac{\pi}{3}$ radians per sec, r = 6 cm, t = 9 sec

16) $\omega = \frac{2\pi}{5}$ radians per sec, r = 9 yd, t = 12 sec

17) $\omega = \frac{\pi}{4}$ radians per sec, r = 2 cm, s = 6π cm

18) $\omega = \frac{2\pi}{5}$ radians per sec, r = $\frac{3}{2}$ m, s = $\frac{12\pi}{5}$ m

19) t = 4 sec, r = 2 km, s = $\frac{3\pi}{4}$ cm

20) t = 12 sec, r = $\frac{4}{3}$ m, s = $\frac{8\pi}{9}$ m

Find ω for each of the following.

21) the hour hand of a clock

22) a line from the center to the edge of a CD revolving 300 times per min

23) the minute hand of a clock

24) the second hand of a clock

Find v for each of the following. (for #25 - #30)

25) the tip of the minute hand of a clock, if the hand is 7 cm long

26) the tip of the second hand of a clock, if the hand is 28 mm long

27) a point on the edge of a flywheel of radius 2 m, rotating 42 times per min

28) a point on the tread of a tire of radius 18 cm, rotating 35 times per minute

29) the tip of an airplane propeller 3 m long, rotating 500 times per minute (Hint: r = 1.5 m)

30) a point on the edge of a gyroscope of radius 83 cm, rotating 680 times per min

31) The tires of a bicycle have a radius 13 in. and are turning at the rate of 200 revolutions per min. How fast is the bicycle traveling in miles per hour? (Hint: 5280 ft = 1 mile)

32) Mars rotates on its axis at the rate of about 0.2552 radian per hr.
Approximately how many hours are in a Martian day?

33) Earth travels about the sun in an orbit that is almost circular. Assume that the orbit is a circle with radius 93,000,000 mi. Its angular and linear speeds are used in designing solar-power facilities.

a) Assume that a year is 365 days, and find the angle formed by Earth's movement in one day with the sun at the vertex.

b) Give the angular speed in radians per hour.

c) Find the linear speed of Earth in miles per hour.

34) A thread is being pulled off a spool at the rate of 59.4 cm per sec. Find the radius of the spool if it makes 152 revolutions per min.

35) A 90-horsepower outboard motor at full throttle will rotate its propeller at 5000 revolutions per min. Find the angular speed of the propeller in radians per second.