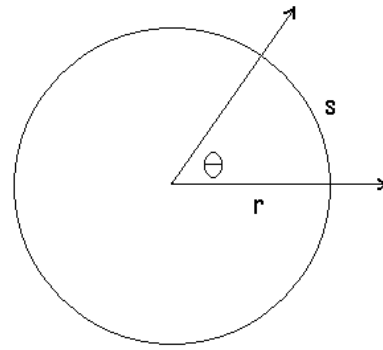


t = time
s = arclength
r = radius
v = velocity (really speed)
 θ = angle in radians
 ω = angular velocity



$$\omega = \frac{\theta}{t} \qquad v = \omega r \qquad v = \frac{s}{t} \qquad s = \theta r$$

Above are the variables, formulas and drawing to assist you in the following problems. As you answer these problems, give angular velocity in radians per second and time in seconds. Give exact answers. Also, give approximate answers when appropriate.

- 1) A record is spinning at the rate of 25 rpm. If a ladybug is sitting 10 cm from the center of the record:
 - a) What is the angular velocity of the ladybug? (in radians/sec)
 - b) What is the speed of the ladybug? (in cm/sec)
 - c) After 20 seconds, how far has the ladybug traveled? (in cm)
 - d) After 20 seconds, what angle has the ladybug turned through? (in radians)
- 2) An ant sits on a cd at a distance of 17 cm from the center. If it sits there for 42 seconds, it travels a total distance of 913 cm.
 - a) What angle has the ant turned through? (in radians)
 - b) What speed has the ant been traveling at? (in cm/sec)
 - c) What angular velocity has the ant been spinning at? (in radians/sec)
 - d) What rpm is the cd turning at?
- 3) A sling is being rotated at the rate of 100 rpm.
 - a) What will the length of the sling have to be so that the speed of the object at the end will be 40 meters per second? (in meters)
 - b) If the sling is 1 meter long, how fast will the object at the end be traveling? (in meters per second)
- 4) A sling that is 3 meters long, sweeps out an area of 50 square meters every 5 seconds.
 - a) What is its angular velocity? (in rad/sec)
 - b) What is its speed? (in m/sec)
 - c) How does doubling the length of the sling affect the previous two answers?