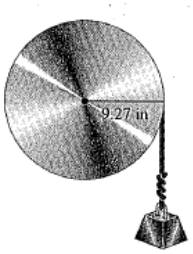
AC Precalculus

Lesson 4.1 APPLICATIONS

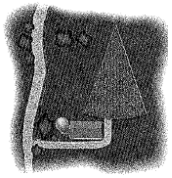
1. A circle has a radius of 18.2 centimeters. Find the length of the arc intercepted by a central angle having each of the following measures.
   a. $\frac{3\pi}{8}\ radians$ **b.** $144°$

2. a. How many inches will the weight in the figure rise if the pulley is rotated through an angle of $71°50'$?
   b. Through what angle, to the nearest minute, must the pulley be rotated to raise the weight 6 inches?



$r = 9.27$ in

3. The picture shows a field in the shape of a sector of a circle. The central angle is $15°$ and the radius of the circle is 321 meters. Find the area of the field.



4. A pulley has a radius of 12.96 cm. Suppose it takes 18 sec for 56 cm of the belt to go around the pulley. Find the angular velocity of the pulley in radians per second.

5. Patrick is riding a racing bike at a speed of 50.4 kilometers per hour. The wheels have a diameter of 70 centimeters. Find the angular velocity of the wheels in radians per second.

6. The crankshaft pulley of a car has a radius of 10.5 cm and turns at 6π rad/sec. What is the linear speed of the pulley?

7. A tire with a 9 inch radius is rotating at 30 mph. Find the angular velocity of a point on its rim. Express the result in radians per minute.

8. If a wheel with a 16 inch diameter is turning at 12 rev/sec, what is the linear speed of a point on its rim in ft/min?

9. The wheel of a machine rotates at the rate of 300 rpm (rotations per minute). If the diameter of the wheel is 80 cm, what are the angular (in radians per second) and linear speed (in cm per second) of a point on the wheel?

10. Dan Druff and Ella Funt are riding on a Ferris wheel. Dan observes that it takes 20 s to make a complete revolution. Their seat is 25 ft from the axle of the wheel.
    a. What is their angular velocity in radians per minute?
    b. What is their linear velocity?

11. David puts a rock in his sling and starts whirling it around. He realizes that in order for the rock to reach Goliath, it must leave the sling at a speed of 60 ft/s. So he swings the sling in a circular path of radius 4 ft. What must the angular velocity be in order for David to achieve his objective?