SM 3H

6.2 Sector Area, Angular and Linear Velocity

2023-2024

SCORE: /

Name_____ Date_____ Period_____

Find the sector area. If you are given radians, write the answer in terms of π (exact answer) and then use the π button to round answers to the nearest tenth. If you are given degrees, round the answer to the nearest tenth of a degree. Show work using the formula. Remember, leave work and answer in the units it begins with.

1. $r = 6$ ft., $\alpha = 30°$

2. $r = 12$ m, $\alpha = 3\pi$

3. $r = 2.1$ km, $\alpha = 135^o$

4. $r = 10$ cm, $\alpha = \frac{5\pi}{12}$

5. $r = 2.4$ ft., $\alpha = \frac{\pi}{9}$

6. $r = 15$ yd., $\alpha = 90°$

Use the sector area formula and the given information to find the indicated measure. Round answers to the nearest tenth if necessary. Show work using the formula. Remember, leave work and answer in the units it begins with.

7. $\alpha = \frac{4\pi}{3}$, $A = 20$ sq. km; find r

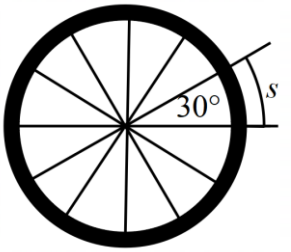
8. $\alpha = 50°$, $A = 20$ sq. in; find r

9. $r = 2$ ft., $A = 48$ sq. ft.; find α (leave answer in radians)

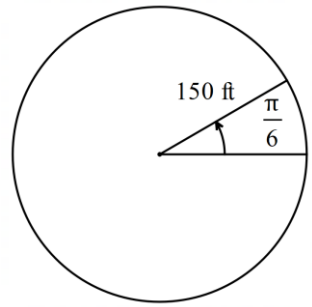
10. $r = 6$ m, $A = 62.25$ sq. m.; find α (leave answer in degrees)

Solve. Be sure to indicate the units for the answer. Round approximate answers to the nearest tenth.

11. The wagon wheel shown has a diameter of 40 inches and an angle of 30° between the spokes. What is the length of the arc *s* between two adjacent spokes?



12. A center-pivot irrigation system is used to water a circular field with a radius of 150 feet, as shown. In three hours the system waters a sector with a central angles of $\frac{\pi}{6}$. What area is watered in that time?



Find the product. Be sure to indicate the units for the answer. Round approximate answers to the nearest tenth.

13. $\frac{4 \text{ rev}}{1 \text{ sec}} \cdot \frac{2\pi \text{ rad}}{1 \text{ rev}}$

14. $\frac{55 \text{ rev}}{1 \text{ min}} \cdot \frac{6\pi \text{ ft}}{1 \text{ rev}}$

15. $\frac{10 \text{ rad}}{1 \text{ min}} \cdot \frac{1 \text{ rev}}{2\pi \text{ rad}} \cdot \frac{60 \text{ min}}{1 \text{ hr}}$

Solve. Be sure to indicate the units for the answer. Round approximate answers to the nearest tenth.

16. Express the angular velocity of 900 rad/sec in rev/sec.

17. A pulley of radius 7 cm rotates 15 times in 128 sec. Find the angular velocity (rad/sec) of the pulley.

18. A wheel with a 22-inch diameter is turning at the rate of 46 revolutions per minute. What is the linear velocity in feet per hour of a point on the rim?

19. A satellite in a circular orbit 879.4 mi above the earth makes one complete orbit every 83.42 min. What is the linear velocity in miles per minute? Use 3963 mi for the length of the radius of the earth.

20. A windmill for generating electricity has a blade that is 30 feet long. Depending on the wind, it rotates at various velocities. In each case, find the angular velocity in rad/sec (to the nearest tenth) for the tip of the blade.

a. 500 rev/sec

b. 11,000 rev/hr

21. A common speed for an electric motor is 6450 revolutions per minute. Saw blades of various diameters can be attached to such a motor. Determine the linear velocity in miles/hour for a point on the edge of a blade with each given diameter.

a. 8 inches

b. 14 inches

22. The first Ferris wheel was built for the Chicago Exposition in 1893. It held 2100 people, had a diameter of 250 feet, and took 30 minutes to make one revolution. Find the linear velocity in feet/second for a person riding the Ferris wheel.

Review—Simplify.

23. $\sqrt{60}$

24. $4\sqrt{6}+2\sqrt{24}-\sqrt{6}$

25. $3\sqrt{2}(4-3\sqrt{6})$

26. $(4-\sqrt{3})(5+2\sqrt{6})$

27. $\frac{5}{\sqrt{2}}$

28. $-\frac{1}{\sqrt{3}}$