

HW 6.11 Arc & Sector Worksheet

I. Given the radian measure of a central angle, find the length of its intercepted arc in terms of π in a circle of radius 10 cm.

$S = r\theta$ or $S = \frac{r\theta\pi}{180}$

1. $\frac{\pi}{6}$

2. $\frac{\pi}{3}$ $S = 10(\frac{\pi}{3}) = \frac{10\pi}{3} \approx 10.47$

3. $\frac{\pi}{2}$

4. $\frac{\pi}{5}$ $S = 10(\frac{\pi}{5}) = \frac{10\pi}{5} = 2\pi \approx 6.14$

5. $\frac{3\pi}{5}$

6. $\frac{4\pi}{7}$ $S = 10(\frac{4\pi}{7}) = \frac{40\pi}{7} \approx 17.95$

7. $\frac{\pi}{12}$

8. $\frac{\pi}{24}$ $S = 10(\frac{\pi}{24}) = \frac{10\pi}{24} = \frac{5\pi}{12} \approx 1.31$

II. Given the measurement of a central angle, find the measure of its intercepted arc in terms of π in a circle of diameter 60 in. $r = 30$

$S = \frac{r\theta\pi}{180}$

9. 10°

10. 60° $S = 30(60)(\frac{\pi}{180}) = 10\pi$

11. 42°

12. 50° $S = 30(50)(\frac{\pi}{180}) = \frac{25\pi}{3}$

13. 72°

14. 110° $S = 30(110)(\frac{\pi}{180}) = \frac{55\pi}{3}$

15. 35°

16. 65° $S = 30(65)(\frac{\pi}{180}) = \frac{65\pi}{6}$

III. Given the measure of an arc, find the degree measure to the nearest tenth of the central angle if subtends in a circle of radius 16 cm.

17. 87

18. 5.6

19. 12

20. 25

$S = \frac{r\theta\pi}{180}$

$5.6 = \frac{16(\theta)\pi}{180}$
 $\theta = 20.1^\circ$

$25 = \frac{16(\theta)\pi}{180}$
 $\theta = 89.5^\circ$

21. 10.24

22. 7.9

23. 11

24. 6

$7.9 = \frac{16(\theta)\pi}{180}$
 $\theta = 28.3^\circ$

$6 = \frac{16(\theta)\pi}{180}$
 $\theta = 21.5^\circ$

IV. Find the area of each sector to the nearest tenth, given its central angle, and the radius of the circle.

$A = \frac{1}{2}r^2\theta$ or $A = \frac{1}{2}r^2\theta\frac{\pi}{180}$

25. $\theta = \frac{\pi}{4}, r = 14$ cm

26. $\theta = \frac{\pi}{6}, r = 12$ ft.

27. $\theta = \frac{5\pi}{12}, r = 10$ ft.

$A = \frac{1}{2}(12^2)(\frac{\pi}{6}) = 37.74$

28. $\theta = 54^\circ, r = 6$ in
 $A = \frac{1}{2}(6^2)(54)(\frac{\pi}{180})$

$\approx 16.96 \approx 17.0$ in²

29. $\theta = 82^\circ, r = 7.3$ km

30. $\theta = 45^\circ, r = 9.75$ mm

$A = \frac{1}{2}(9.75^2)(45)(\frac{\pi}{180}) = 37.3$ mm²

HONORS: (round answers to nearest tenth)

31. A sector has arc length of 6 cm and a central angle measuring 1.2 radians. Find the radius of the circle and the area of the sector.

$S = r\theta\frac{\pi}{180}$

$10 = r(50)(\frac{\pi}{180})$

$r \approx 11.46$ in

$A = \frac{1}{2}r^2\theta\frac{\pi}{180}$

$A = \frac{1}{2}(11.46^2)(50)(\frac{\pi}{180})$

$A \approx 57.30$ in²

32. A sector has arc length of 10 in and a central angle measuring 50° . Find the radius of the circle and the area of the sector.