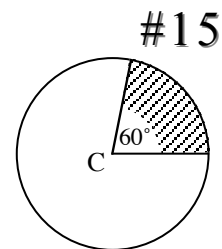
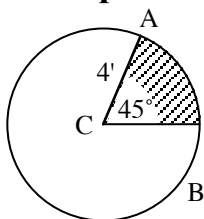


AREA OF SECTORS

SECTORS of a circle are formed by the two radii of a central angle and the arc between their endpoints on the circle. For example, a 60° sector looks like a slice of pizza. The area of a sector is found by multiplying the fraction of the circle by the area of the whole circle.



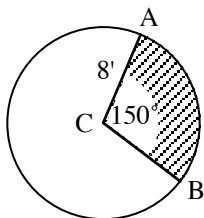
Example 1



Find the area of the 45° sector. First find the fractional part of the circle involved. $\frac{m\widehat{ZY}}{360^\circ} = \frac{45^\circ}{360^\circ} = \frac{1}{8}$ of the circle's area. Next find the area of the circle: $A = \pi r^2 = 16\pi$ sq.ft. Finally, multiply the two results to find the area of the sector.

$$\frac{1}{8} \cdot 16\pi = 2\pi \approx 6.28 \text{ sq.ft.}$$

Example 2



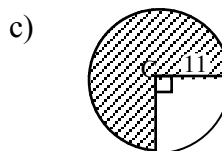
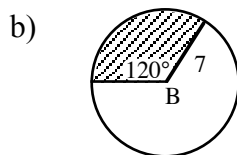
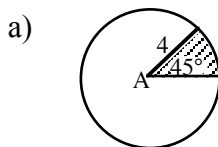
Find the area of the 150° sector.

Fractional part of circle is $\frac{m\widehat{AB}}{360^\circ} = \frac{150^\circ}{360^\circ} = \frac{5}{12}$

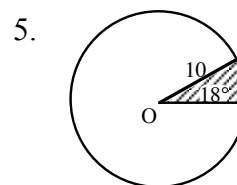
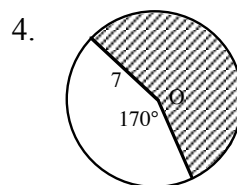
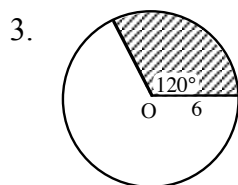
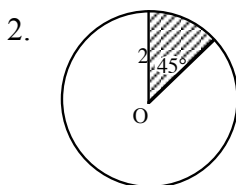
Area of circle is $A = \pi r^2 = \pi 8^2 = 64\pi$ sq.ft.

Area of the sector: $\frac{5}{12} \cdot 64\pi = \frac{320\pi}{12} = \frac{80\pi}{3} \approx 83.76$ sq.ft.

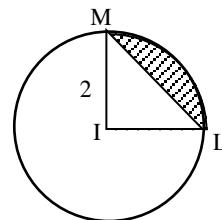
1. Find the area of the shaded sector in each circle below. Points A, B and C are the centers.



Calculate the area of the following shaded sectors. Point O is the center of each circle.

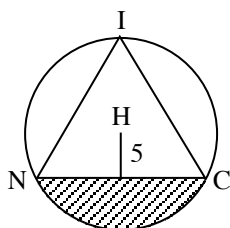


6. The shaded region in the figure is called a segment of the circle. It can be found by subtracting the area of $\triangle MIL$ from the sector MIL. Find the area of the segment of the circle.

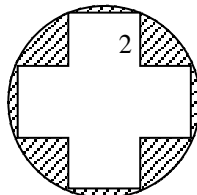


Find the area of the shaded regions.

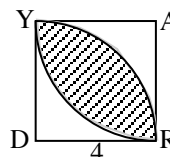
7.



8.



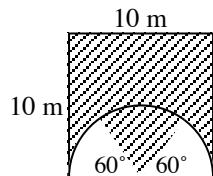
9. YARD is a square; A and D are the centers of the arcs.



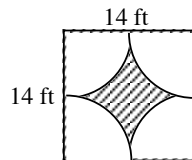
10. Find the area of a circular garden if the diameter of the garden is 30 feet.
11. Find the area of a circle inscribed in a square whose diagonal is 8 feet long.
12. The area of a 60° sector of a circle is $10\pi \text{ m}^2$. Find the radius of the circle.
13. The area of a sector of a circle with a radius of 5 mm is $10\pi \text{ mm}^2$. Find the measure of its central angle.

Find the area of each shaded region.

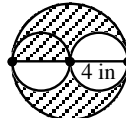
14.



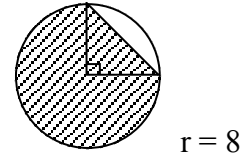
15.



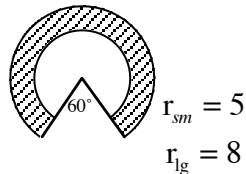
16.



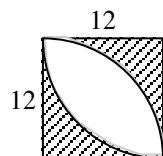
17.



18.

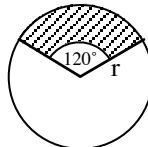


19.



20.

Find the radius. The shaded area is $12\pi \text{ cm}^2$.



Answers

1. a) $2\pi u^2$ b) $\frac{49}{3}\pi u^2$ c) $\frac{363\pi}{4}u^2$
2. $\frac{\pi}{2}$ 3. 12π 4. $\frac{931\pi}{36}$ 5. 5π
6. $\pi - 2u^2$ 7. $\frac{100}{3}\pi - 25\sqrt{3}u^2$ 8. $10\pi - 20u^2$ 9. $8\pi - 16u^2$
10. $225\pi \text{ ft}^2$ 11. $8\pi \text{ ft}^2$ 12. $2\sqrt{15} \text{ m}$ 13. 144
14. $100 - \frac{25}{3}\pi \text{ m}^3$ 15. $196 - 49\pi \text{ ft}^2$ 16. $10\pi \text{ in}^2$ 17. $48\pi + 32u^2$
18. $\frac{65}{2}\pi u^2$ 19. $\approx 61.8 u^2$ 20. $6u$