# Area and Circumference of Circles

*This worksheet requires you to calculate circumference, area, arc length, and sector area. Give all non-exact answers correct to 3 significant figures and remember to include units.*

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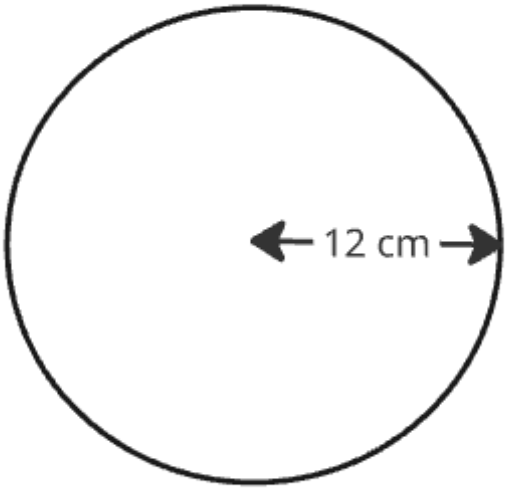
### Full Circles and Simple Sectors

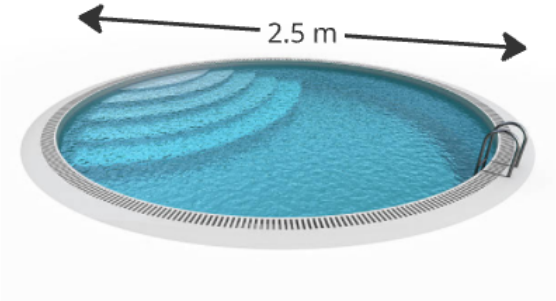
1. A circle has a radius of $12\ \text{cm}$. Calculate:

a. The circumference.

b. The area.



2. A circular swimming pool has a diameter of $16\ \text{m}$. Calculate the area of the pool's surface.

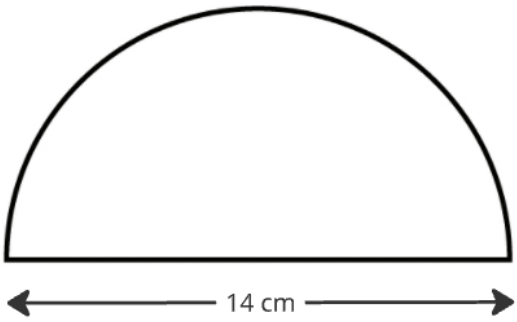



3. The circumference of a circular hoop is $2.5\ \text{m}$. Find the diameter of the hoop.

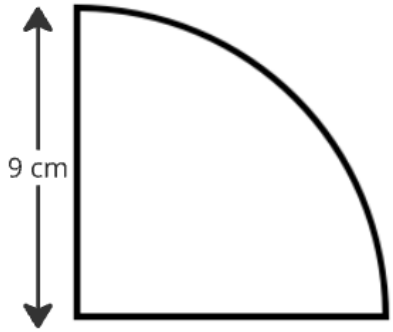
4. A semicircle (half circle) has a diameter of $14\ \text{cm}$. Calculate:

a. The area of the semicircle.

b. The perimeter of the semicircle (the curved arc plus the straight edge).

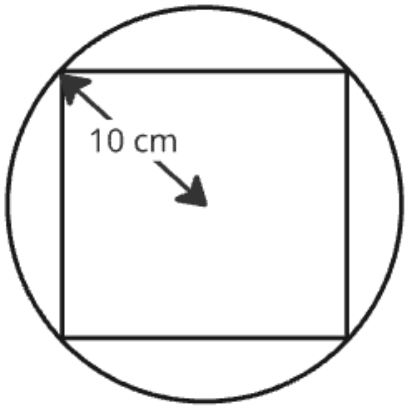



5. A quarter-circle (quadrant) has a radius of $9\ \text{m}$. Calculate its area and its perimeter.



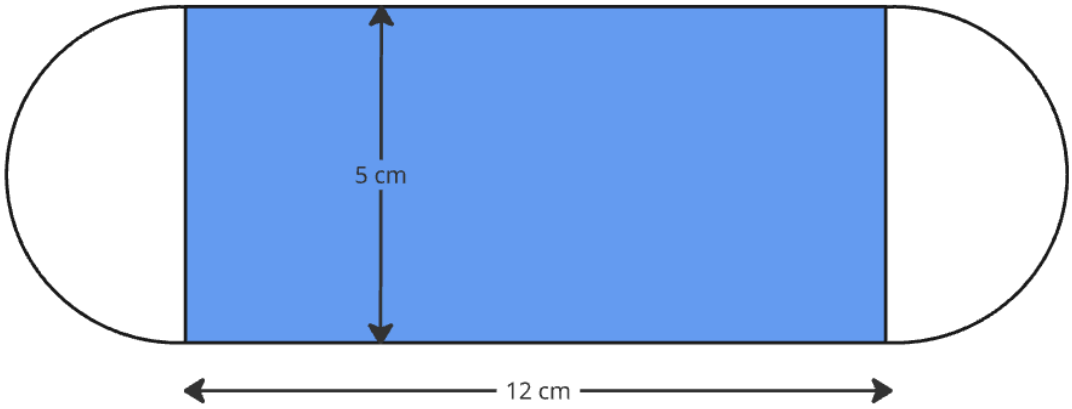
6. A circular disc has an area of $500\ \text{cm}^2$. Find the radius and the circumference of the disc.

7. A square is inscribed within a circle. The radius of the circle is $10\ \text{cm}$. Find the area of the square.
*(Hint: The diameter of the circle is the diagonal of the square.)*



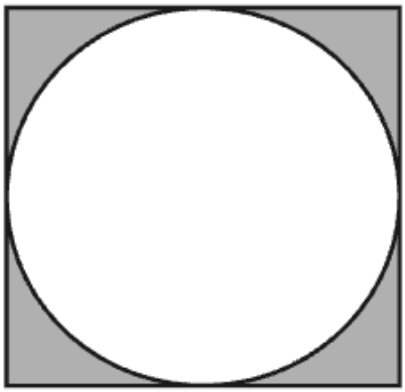
## Composite Shapes and Application

8. A company logo is made from a rectangle $5\ \text{cm} \times 12\ \text{cm}$ with two semicircles attached to the $5\ \text{cm}$ sides. Find the total area of the logo.

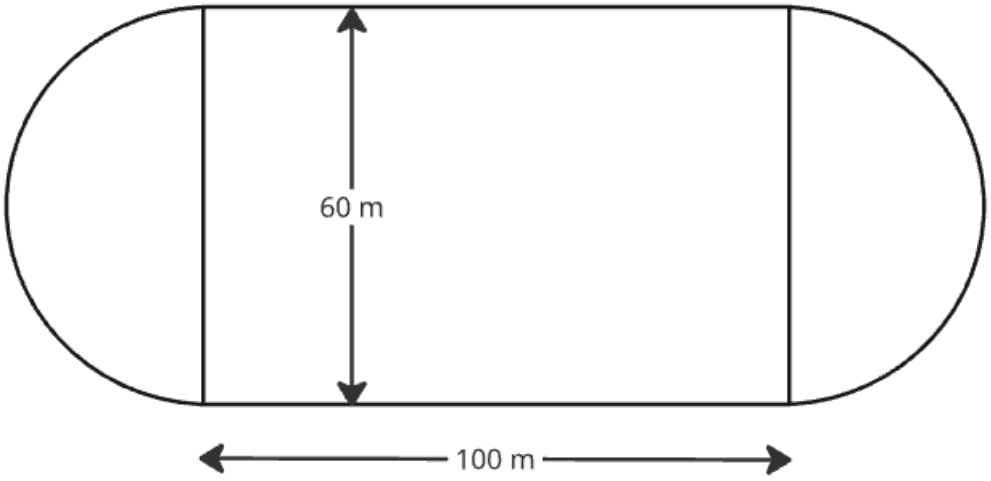



9. A car wheel has a radius of $35\ \text{cm}$. How many complete rotations does the wheel make when the car travels $1\ \text{km}$? (Remember to convert units first.)

10. Find the area of the shaded region below, which is the area between a square of side length $10\ \text{cm}$ and an inscribed circle (which touches all four sides).



11. A running track is formed by a rectangle of $100\ \text{m}$ by $60\ \text{m}$ with two semi-circles on the shorter sides. Calculate the total area of the running track.



## Arc Length and General Sector Area

For these problems, use the general formulas: Arc Length $= \frac{\theta}{360} \times 2\pi r$ and Sector Area $= \frac{\theta}{360} \times \pi r^2$.

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12. A circle has a radius of $15\ \text{cm}$. A sector of this circle has a central angle of $72^\circ$. Calculate:

a. The length of the arc.

b. The area of the sector.

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13. A circular garden bed has a diameter of $8\ \text{m}$. A $120^\circ$ sector of the bed is dedicated to roses. Find the area of the rose section.

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14. Calculate the perimeter of the sector with a radius of $6\ \text{cm}$ and a central angle of $150^\circ$.

15. **Reverse Problem:** An arc of a circle is $20\ \mathrm{m}$ long. If the radius of the circle is $8\ \mathrm{m}$, calculate the central angle of the arc to the nearest degree.