

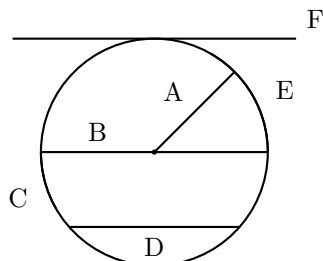
Foundation GCSE: Circles

Name: _____

Class: _____

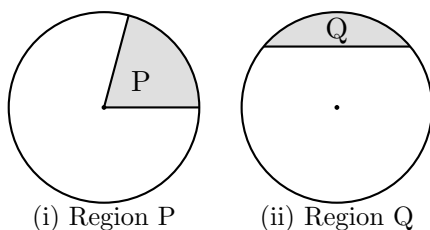
Instructions: Answer all questions. Questions are ordered from easiest (1) to hardest (15). Working out should be shown where appropriate.

1. (i) The diagram below shows a circle with parts labelled A, B, C, D, E, and F.



Match A, B, C, D, E, F to: *radius, diameter, circumference, chord, arc, tangent.*

- (ii) The diagrams below show two shaded regions inside circles.



State whether Region P and Region Q represent a **sector** or a **segment**.

2. A circle has a radius of 6 cm. Calculate its diameter.
3. Calculate the circumference of a circle with a radius of 5 cm. Give your answer to 1 decimal place.
4. Calculate the area of a circle with a radius of 4 cm. Give your answer to 1 decimal place.
5. Find the area of a circle with a diameter of 10 cm. Give your answer in terms of π .
6. Calculate the perimeter of a semicircle with a radius of 7 cm. Give your answer to 1 decimal place.
7. Calculate the area of a quadrant (a quarter of a circle) with a radius of 8 cm. Give your answer to 1 decimal place.
8. Find the length of an arc of a circle with radius 6 cm and a sector angle of 60° . Give your answer in terms of π .
9. A sector has a radius of 9 cm and an angle of 120° . Calculate the area of the sector in terms of π .
10. The area of a semicircle is $32\pi \text{ cm}^2$. Find the length of its straight edge.
11. A square of side length 10 cm contains a circular hole of radius 3 cm. Calculate the remaining area of the square to 1 decimal place.
12. A sector with angle θ and radius 12 cm has an arc length of 4π cm. Find the angle θ .
13. A metal washer is formed by cutting a circle of radius 2 cm out of a larger circle of radius 5 cm. Calculate the surface area of one face of the washer to 1 decimal place.
14. A sector of a circle has a radius of 10 cm and a perimeter of 28 cm. Find the area of the sector.
15. A circle is inscribed perfectly inside a square of area 64 cm^2 . Express the area of the region inside the square but outside the circle in the form $a - b\pi$.

Answers & Worked Solutions

1. (i) A: Radius, B: Diameter, C: Circumference, D: Chord, E: Arc, F: Tangent. (ii) Region P: Sector, Region Q: Segment.

2. $12 \text{ cm} : 2 \times 6 = 12.$

3. $31.4 \text{ cm} : C = 2 \times \pi \times 5 = 10\pi \approx 31.4.$

4. $50.3 \text{ cm}^2 : A = \pi \times 4^2 = 16\pi \approx 50.3.$

5. $25\pi \text{ cm}^2 : r = 5, A = \pi \times 5^2 = 25\pi.$

6. $36.0 \text{ cm} : \text{Arc} = \pi \times 7 \approx 21.99, \text{ Perimeter} = 21.99 + 14 = 35.99 \approx 36.0.$

7. $50.3 \text{ cm}^2 : A = \frac{\pi \times 8^2}{4} = 16\pi \approx 50.3.$

8. $2\pi \text{ cm} : \text{Arc} = \frac{60}{360} \times 2\pi \times 6 = \frac{1}{6} \times 12\pi = 2\pi.$

9. $27\pi \text{ cm}^2 : A = \frac{120}{360} \times \pi \times 9^2 = \frac{1}{3} \times 81\pi = 27\pi.$

10. $16 \text{ cm} : \frac{1}{2}\pi r^2 = 32\pi \implies r^2 = 64 \implies r = 8,$
edge is diameter = 16.

11. $71.7 \text{ cm}^2 : \text{Area} = 10^2 - \pi \times 3^2 = 100 - 9\pi \approx 100 - 28.27 = 71.73 \approx 71.7.$

12. $60^\circ : \frac{\theta}{360} \times 2\pi \times 12 = 4\pi \implies \frac{\theta}{360} \times 24\pi = 4\pi \implies \theta = 60.$

13. $66.0 \text{ cm}^2 : \text{Area} = \pi(5^2 - 2^2) = 21\pi \approx 65.97 \approx 66.0.$

14. $40 \text{ cm}^2 : \text{Arc length} = 28 - (10 + 10) = 8 \text{ cm},$
 $\text{Area} = \frac{1}{2}rl = \frac{1}{2} \times 10 \times 8 = 40.$

15. $64 - 16\pi : \text{Side length} = 8, \text{ radius of inscribed circle} = 4. \text{ Area} = 8^2 - \pi(4^2) = 64 - 16\pi.$