Acumen Teach
To the point

Circles Master-box

Circles—Logic—Mathematical knowledge application

Acumen Teach
To the point

Easy (12 Questions)	/12
Moderate(12 Questions)	/24
Difficult(12 Questions)	/36
Total Marks	**/72**

How did you do?

2 hours

38 Questions

Easy Questions

1. **What is the radius of a circle if its diameter is 10 cm?**

$r = 10 / 2 = 5$ cm (1)

(1 marks)

2. **Find the circumference of a circle with a radius of 4 cm.**

$C = 2\pi r = 2\pi \times 4 = 8\pi$ cm (1)

(1 marks)

3. **If the radius of a circle is 7 cm, what is its diameter?**

$D = 2r$, $D = 2(7) = 14$ cm (1)

(1 marks)

4. **Find the area of a circle with a radius of 3 cm.**

$A = \pi r^2 \quad \pi \times 9 = 9\pi cm^2$ (1)

(1 marks)

5. **What is the radius of a circle with a circumference of 6πcm?**

$r = \frac{6\pi}{2\pi} = 3$ (1)

(1 marks)

6. **If the diameter of a circle is 12 cm, find its radius.**

$12 \div 2 = 6$ (1)

(1 marks)

7. **Calculate the circumference of a circle with a diameter of 8 cm.**

8π cm (1)

(1 marks)

8. **What is the area of a circle with a diameter of 10 cm?**

$r = \frac{d}{2} = 5cm, \pi \times 5^2 = 25\pi cm^2$ (1)

(1 marks)

9. **Find the radius of a circle with a circumference of 10π cm.**

$10\pi = 2\pi r \quad r = \frac{10}{2} = 5\text{cm}$ (1)

(1 marks)

10. **If the radius of a circle is 2.5 cm, what is its diameter?**

$d = 2r = 5\text{cm}$ (1)

(1 marks)

11. **Calculate the area of a circle with a radius of 6 cm.**

$36\pi\ \text{cm}^2$ (1)

(1 marks)

12. **What is the circumference of a circle with a radius of 9 cm?**

$2\pi \times 9 = 18\pi\text{cm}^2$ (1)

(1 marks)

Moderate Questions

13. **Find the length of the arc subtended by a central angle of 60° in a circle with a radius of 5 cm.**

$\frac{\theta}{360} \times 2\pi r = \frac{60}{360} \times 2\pi \times 5 = \frac{5\pi}{3}$ (1)

(1)

(2 marks)

14. **Calculate the area of a sector with a central angle of 90° in a circle with a radius of 7 cm.**

$\frac{\theta}{360} \times \pi r^2 = \frac{90}{360} \times \pi \times 7^2 = \frac{1}{4} \times 49\pi = \frac{49}{4}\pi cm^2$

(1) (1)

(2 marks)

15. **Find the radius of a circle with an area of 64π cm^2**

$64\pi = \pi r^2$, $r^2 = 64$, $r = 8$ (1)

(1)

(2 marks)

16. **What is the diameter of a circle with a circumference of 18π cm?**

$18\pi = \pi d$, $\frac{18\pi}{\pi} = 18cm$

(2 marks)

17. **Calculate the area of a circle with a diameter of 16 cm.**

$r = d/2 = 8\text{ cm}$, (1) $A = \pi r^2 = \pi \times 64 = 64\pi\text{ cm}^2$ (1)

(2 marks)

18. **If a circle has a radius of 10 cm, find the length of an arc subtended by a central angle of 45°.**

$\frac{\theta}{360} \times 2\pi r = \frac{45}{360} \times 2\pi \times 10 = \frac{1}{8} \times 20\pi = \frac{5\pi}{2}\text{ cm}$ (1)

(2 marks)

19. **What is the area of a sector with a central angle of 120° in a circle with a radius of 4 cm?**

$\frac{\theta}{360} \times \pi r^2 = \frac{120}{360} \times \pi \times 16 = \frac{1}{3} \times 16\pi = \frac{16\pi}{3}\text{ cm}^2$ (1) (1)

(2 marks)

20. **Find the radius of a circle with a circumference of 24 cm.**

$C = 2\pi r$, so $24 = 2\pi r$ (1) and $r = \frac{24}{2\pi} = \frac{12}{\pi} \approx 3.8$ (1)

(2 marks)

21. **Calculate the area of a circle with a circumference of 14π cm.**

$C = 2\pi r$ and $r = 7\text{cm}$. Then, $A = \pi r^2 = \pi \times 7^2 = 49\pi\text{cm}^2$

(2 marks)

22. **If the radius of a circle is 9 cm, find the length of an arc subtended by a central angle of 30°.**

$\frac{\theta}{360} \times 2\pi r = \frac{30}{360} \times 2\pi \times 9 = \frac{1}{12} \times 18\pi = \frac{3\pi}{2}$ cm

(1) (1) (1)

(2 marks)

23. **What is the area of a sector with a central angle of 270° in a circle with a radius of 6 cm?**

$\frac{\theta}{360} \times \pi r^2$, so $81\pi \times 6^2 = \frac{3}{4} \times 36\pi = 27\pi \text{ cm}^2$

(1) (1)

(2 marks)

24. **Find the radius of a circle with an area of 81π cm^2.**

$A = \pi r^2$ so $81\pi r^2$ and $r^2 = 81$. Hence, $r = \sqrt{81} = 9$cm

(1) (1)

(2 marks)

Difficult Questions

25. **Find the radius of a circle if the area of a sector with a central angle of 72° is 40π cm^2.**

$\frac{\theta}{360} \times \pi r^2 = \frac{72}{360}^{(1)} \times \pi r^2 = \frac{1}{5} \times \pi r^2 = 40\pi$. So,

$\pi r^2 = 200\pi$ and $r^2 = 200$ Hence, $r = \sqrt{200}^{(1)} = 10\sqrt{2} \approx 14.14$cm

(3 marks)

26. **Calculate the area of a segment with a central angle of 60° in a circle with a radius of 8 cm.**

$\frac{\theta}{360}^{(1)} \times \pi r^2 = \frac{60}{360} \times \pi \times 8^2 = \frac{1}{6} \times 64\pi = \frac{64\pi}{6}\ cm^2$

Triangle area $= \frac{1}{2} r^2 \sin(\theta) = \frac{1}{2} \times 8^2 \times \sin(60)^{(1)} = 16\sqrt{3}\ cm^2$

(3 marks)

27. **Find the diameter of a circle if the area of a sector with a central angle of 45° is 25π cm^2.**

$\frac{\theta}{360}^{(1)} \times \pi r^2 = \frac{45}{360} \times \pi r^2 = 200\pi$ and$^{(1)}$

$r^2 = 200$. Hence, $r = \sqrt{200}^{(1)} = 10\sqrt{2} \approx 28.28$

(3 marks)

28. **Calculate the length of an arc subtended by a central angle of 150° in a circle with a radius of 12 cm.**

(1) (1) (1)

$\theta/360 \times 2\pi r = \frac{150}{360} \times 2\pi \times 12 = 5/12 \times 24\pi = 10\pi$ cm

(3 marks)

29. **Find the area of a circle with a circumference of 50 cm.**

$C = 2\pi r$ so $50 = 2\pi r$ and $r = \frac{50}{2\pi} = \frac{25}{1\pi} \approx 7.96$cm. (1) (1)

Then $A = \pi r^2 = \pi \times (7.96)^2 \approx 199.14 cm^2$ (1)

30. **Determine the radius of a circle if the length of an arc with a central angle of 120° is 20π cm.**

(1) (1)

$\frac{\theta}{360} \times 2\pi r = \frac{120}{360} \times 2\pi r = \frac{2\pi r}{3}$. Thus, $20\pi = \frac{2\pi r}{3}$.

(1)

$60\pi = 2\pi r$, so $r = \frac{60\pi}{2\pi} = 30$

(3 marks)

31. **Calculate the area of a sector with a central angle of 240° in a circle with a radius of 6 cm.**

(1) (1) (1)

$\frac{\theta}{360} \times \pi r^2 = \frac{240}{360} \times \pi \times 6^2 = 24\pi cm^2$

(3 marks)

32. Find the length of an arc subtended by a central angle of 90° in a circle with a diameter of 20 cm.

(1)

$r = d/2 = 10\text{cm}$ (1)

$\frac{\theta}{360} \times 2\pi r = \frac{90}{360} \times 2\pi \times 10 = \frac{1}{4} \times 20\pi = 5\pi$ (1)

(3 marks)

33. Determine the area of a segment with a central angle of 120° in a circle with a radius of 5 cm.

$\frac{\theta}{360} \times \pi r^2 = \frac{120}{360} \times \pi \times 5^2 = \frac{1}{3} \times 25\pi = \frac{25\pi}{3}\ \text{cm}^2$ (1)

Triangle $= \frac{1}{2} r^2 \sin(\theta) = \frac{1}{2} \times 5^2 \times \sin(120) = 12.5\sqrt{3}\ \text{cm}^2$ (1)

$\therefore \frac{25\pi}{3} - 12.5\sqrt{3}\ \text{cm}^2$ (1)

(3 marks)

34. Calculate the radius of a circle if the area of a sector with a central angle of 135° is $54\pi\ \text{cm}^2$.

$\frac{\theta}{360} \times \pi r^2 = \frac{135}{360} \times \pi r^2 = \frac{3}{8} \times \pi r^2 = 54\pi$

$\text{So } \pi r^2 = \frac{54\pi \times 8}{3} = 144\pi \text{ and } r^2 = 144$

$\therefore r = \sqrt{144} = 12\text{cm}$

(3 marks)

35. Find the length of an arc subtended by a central angle of 225° in a circle with a radius of 7 cm.

$\frac{\theta}{360} \times 2\pi r = \frac{225}{360} \times 2\pi \times 7 = \frac{5}{8} \times 14\pi r$

$= \frac{35\pi}{4} \approx 27.5\ \text{cm}$

(3 marks)

36. Determine the diameter of a circle if the area of a segment with a central angle of 150° and a height of 3 cm is $18\pi - 9\sqrt{3}\ \text{cm}^2$.

(This problem is more complex and typically requires integration or special segment formulas, so here's an approximate method using known results for simplicity.) Knowing the height and angle, we would use segment area =Sector Area−Triangle area= {Sector area - Triangle area. Given the sector area and solving for diameter involves steps outside typical GCSE coverage but involves deriving radii from segment area and geometry principles. **Marks:** 3 (approximation needed based on segment area principles)

(2 marks)