Arcs and Sectors: exam practice

10 questions · 26 marks · worked solutions and markschemes

Name _____ Date _____ Score / 26

- Answer every question before you look at the solutions. They start after the last question, with the marks for each line: M for method, A for accuracy, R for reasoning.
- Online, with more practice: ibmathrevision.com/hlai/arcs-and-sectors-exam-practice

1. **2 marks · Paper 1 style · calculator allowed**

Convert an angle of 2.4 radians to degrees, giving your answer to the nearest degree.

2. **2 marks · Paper 1 style · calculator allowed**

Convert $\frac{11\pi}{9}$ radians to degrees.

3. **2 marks · Paper 1 style · calculator allowed**

Convert 2.4 radians to degrees and $54°$ to radians.

Convert both. **[2]**

4. **2 marks · Paper 2 style · calculator allowed**

A pendulum 75 cm long swings through an angle of $25°$.

Find the length of the arc through which the bob swings. **[2]**

5. **3 marks · Paper 1 style · calculator allowed**

A sector has radius 14 cm and angle 1.5 radians.

Find the arc length, the area and the perimeter. **[3]**

6. **3 marks · Paper 1 style · calculator allowed**

A sector has area $50\ \text{cm}^2$ and angle 1.25 radians.

Find the radius and the arc length. **[3]**

7. **3 marks · Paper 2 style · calculator allowed**

A windscreen wiper of length 50 cm is fixed at a pivot; only the outer 35 cm is rubber. It sweeps through $110°$.

Find the area of windscreen cleaned. **[3]**

8. **2 marks · Paper 1 style · calculator allowed**

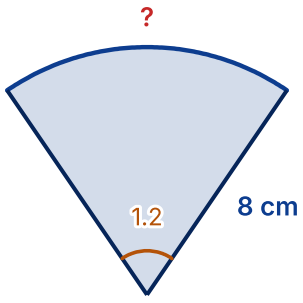
Express $150°$ in radians, and express $\frac{7\pi}{4}$ radians in degrees.

9. **3 marks · Paper 1 style · calculator allowed**

A sector of a circle has radius 8 cm and angle 1.2 radians.

a. Find the length of the arc. **[1]**

b. Find the area of the sector. **[2]**

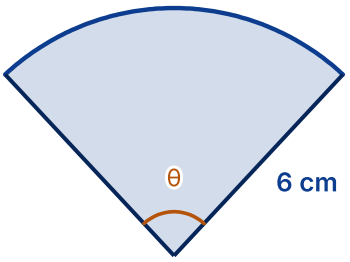


10. **4 marks · Paper 1 style · calculator allowed**

A sector of a circle has area $27\ \text{cm}^2$ and radius 6 cm.

a. Find the angle of the sector in radians. **[2]**

b. Find the perimeter of the sector. **[2]**



Answers and worked solutions

Question 1 — 2 marks

Answer: $138°$

$2.4 \times \frac{180}{\pi}$ **(M1)**

$138°$ **A1**

Question 2 — 2 marks

Answer: $220°$

$\frac{11\pi}{9} \times \frac{180}{\pi}$ **(M1)**

$220°$ **A1**

Question 3 — 2 marks

Answer: $137.5°$; 0.942

$137.5°$ **A1**

0.942 **A1**

Question 4 — 2 marks

Answer: 32.7 cm

$75 \times \frac{25\pi}{180}$ **M1**

32.7 cm **A1**

Question 5 — 3 marks

Answer: 21 cm, $147\ \text{cm}^2$, 49 cm

21 cm **A1**

$147\ \text{cm}^2$ **A1**

49 cm **A1**

Question 6 — 3 marks

Answer: $r = 8.94$ cm; 11.2 cm

$\frac{1}{2}r^2(1.25) = 50$ **M1**

$r = 8.94$ cm **A1**

arc 11.2 cm **A1**

Question 7 — 3 marks

Answer: $2180\ \text{cm}^2$

$\frac{1}{2}(50^2 - 15^2) \times \frac{110\pi}{180}$ $M1$**A1**

$2180\ \text{cm}^2$ **A1**

Question 8 — 2 marks

Answer: ($150°$ in radians) $5\pi/6$; ($\frac{7\pi}{4}$ in degrees) $315°$

$150 \times \frac{\pi}{180} = \frac{5\pi}{6}$ **A1**

$\frac{7\pi}{4} \times \frac{180}{\pi} = 315°$ **A1**

Question 9 — 3 marks

Answer: (a) arc (cm) 9.6; (b) area (cm^2) 38.4

a. $8 \times 1.2 = 9.6$ cm **A1**

b. $\frac{1}{2}(8^2)(1.2)$ **(M1)**

$= 38.4\ \text{cm}^2$ **A1**

Question 10 — 4 marks

Answer: (a) 1.5; (b) perimeter (cm) 21

a. $\frac{1}{2}(6^2)\theta = 27$ **M1**

$\theta = 1.5$ **A1**

b. arc $= 6 \times 1.5 = 9$ cm **(A1)**

perimeter $= 9 + 12 = 21$ cm **A1**

Every solution is also on ibmathrevision.com/hlai/arcs-and-sectors-exam-practice
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