



5.17F Sector Areas and Arc Lengths: Foundation Tier Practice

EDEXCEL Edexcel 1MA1 · Calculator allowed · about 60 minutes

Total Marks

Name: _____ Date: ____ / ____ / ____

Answer ALL questions. Show all your working.

- 1** A circle has radius 7 cm. Work out the circumference of the whole circle. Give your answer to 1 decimal place. Use $\pi = 3.14159$.

(Total for Question 1 is 1 mark)

- 2** A circle has radius 5 cm. Find the area of the whole circle. Give your answer correct to 1 decimal place. Use $\pi = 3.14159$.

(Total for Question 2 is 2 marks)

- 3** Find the fraction of the circle represented by a sector with angle 90 degrees. Give the fraction in simplest form and then find the area of the sector for a circle of radius 6 cm. Give your area answer to 1 decimal place. Use $\pi = 3.14159$.

(a) Write the fraction of the circle that a 90 degree sector represents, in simplest form. (1)

(b) Find the area of the sector when $r = 6$ cm. Give your answer to 1 decimal place. (2)

(Total for Question 3 is 3 marks)

- 4 A sector has radius 8 cm and angle 45 degrees. Work out the length of the arc of the sector. Give your answer to 1 decimal place. Use $\pi = 3.14159$.

(Total for Question 4 is 3 marks)

- 5 A wheel has diameter 1.2 m. A tyre maker paints a 60 degree sector on the tyre. Work out the area of the painted sector in square metres. Give your answer to 3 decimal places. Use $\pi = 3.14159$.

(Total for Question 5 is 4 marks)

- 6 The arc length of a sector is 5 cm and the radius of the circle is 10 cm. Work out the angle of the sector in degrees. Give your answer to 1 decimal place. Use $\pi = 3.14159$.

(Total for Question 6 is 4 marks)

- 7 A circular garden has radius 14 m. A path is made that follows an arc of 120 degrees around the garden. The path is 2 m wide and runs along the outside edge of the garden (so the outer radius is 16 m). Work out the area of the path only. Give your answer to 1 decimal place. Use $\pi = 3.14159$.

(Total for Question 7 is 5 marks)

- 8** A circular sign has radius 0.4 m. A coloured sector on the sign has area 0.1005 m^2 . Work out the angle of the coloured sector, in degrees, correct to 1 decimal place. Use $\pi = 3.14159$.

(Total for Question 8 is 8 marks)

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Question 1

- **B1** 43.9823... rounded to 44.0 cm cao
- **Answer: 44.0 cm**

Question 2

- **M1** use $\text{area} = \pi * r^2$ with $r = 5$
- **A1** 78.5 cm² cao (78.53975... rounded to 78.5)
- **Answer: 78.5 cm²**

Question 3

- (a) **B1** 1/4 cao
- (a) **Answer: 1/4**
- (b) **M1** area sector = fraction * $\pi * r^2 = 1/4 * \pi * 6^2$
- (b) **A1** 28.3 cm² cao ($1/4 * \pi * 36 = 9 * \pi = 28.27431...$ -> 28.3)
- (b) **Answer: 28.3 cm²**

Question 4

- **M1** use arc length = $(\text{angle}/360) * 2 * \pi * r = 45/360 * 2 * \pi * 8$
- **M1** calculate $45/360 = 1/8$ so arc length = $1/8 * 2 * \pi * 8 = 2 * \pi$
- **A1** 6.3 cm cao ($2 * 3.14159 = 6.28318$ -> 6.3)
- **Answer: 6.3 cm**

Question 5

- **M1** use $r = 0.6$ m and area sector = $(60/360) * \pi * r^2$
- **M1** substitute: $(1/6) * \pi * 0.6^2 = (1/6) * \pi * 0.36$
- **A1** 0.188495... m² correct to 3 dp 0.188 m²
- **B1** final answer stated as 0.188 m² cao
- **Answer: 0.188 m²**

Question 6

- **M1** use arc = $(\text{angle}/360) * 2 * \pi * r$ so angle = $\text{arc} * 360 / (2 * \pi * r)$
- **M1** substitute angle = $5 * 360 / (2 * \pi * 10)$ and simplify
- **A1** 28.6 degrees cao (28.6479... -> 28.6 degrees)
- **B1** final answer given as 28.6 degrees
- **Answer: 28.6 degrees**

Question 7

- **M1** area path = fraction $(120/360) * (\pi * R^2 - \pi * r^2)$
- **M1** substitute $R = 16$, $r = 14$ so area = $1/3 * \pi * (256 - 196) = 1/3 * \pi * 60$
- **M1** calculate $1/3 * 60 = 20$ so area = $20 * \pi$
- **A1** 62.8318... -> 62.8 m² (1 dp)
- **B1** final answer given as 62.8 m² cao
- **Answer: 62.8 m²**

Question 8

- **M1** use area sector = $(\text{angle}/360) * \pi * r^2$
- **M1** rearrange to angle = $\text{area} * 360 / (\pi * r^2)$
- **M1** substitute values: area = 0.1005, r = 0.4 so $r^2 = 0.16$
- **M1** calculate denominator $\pi * r^2 = 3.14159 * 0.16 = 0.5026544$ (or equivalent)
- **M1** calculate numerator area * 360 = $0.1005 * 360 = 36.18$
- **M1** divide to get angle = $36.18 / 0.5026544 = 72.000\dots$ (allow calculator evaluation)
- **M1** round to 1 decimal place correctly
- **A1** 72.0 degrees
- **Answer: 72.0 degrees**