5.17 Sector Areas and Arc Lengths: 30-minute Pack

EDEXCEL 1MA1 · Calculator allowed · about 30 minutes

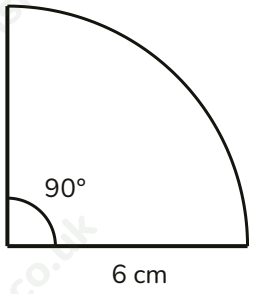
Total Marks

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

1 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 π = 3.14159.

Diagram NOT accurately drawn



(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)**

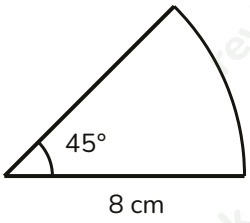
.....

(Total for Question 1 is 3 marks)

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2 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 π = 3.14159.

Diagram NOT accurately drawn

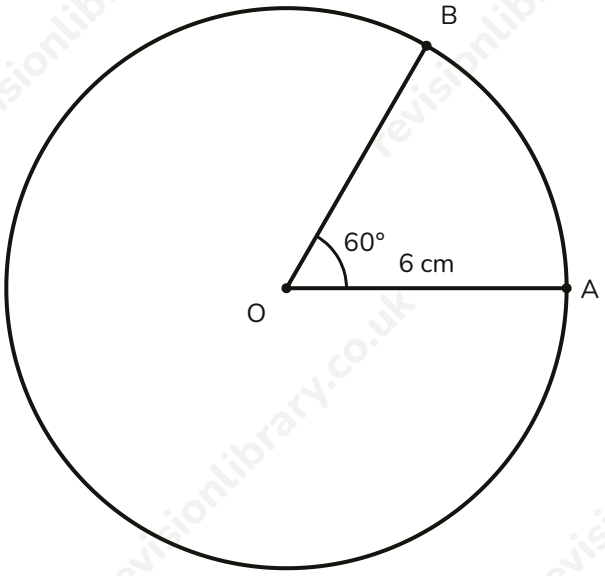


(Total for Question 2 is 3 marks)

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3 A sector of a circle has centre O, radius 6 cm and angle AOB = 60 degrees. Calculate the length of arc AB, giving your answer to 3 significant figures.

Diagram NOT accurately drawn

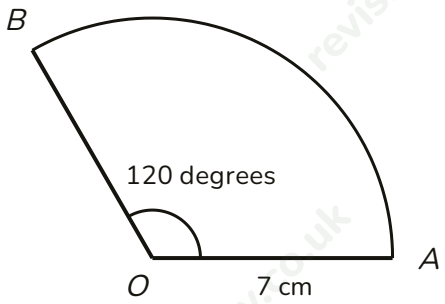


(Total for Question 3 is 2 marks)

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4 A sector of a circle has centre O, radius 7 cm and angle AOB = 120 degrees. Calculate the perimeter of the sector OAB, giving your answer correct to 3 significant figures.

Diagram NOT accurately drawn

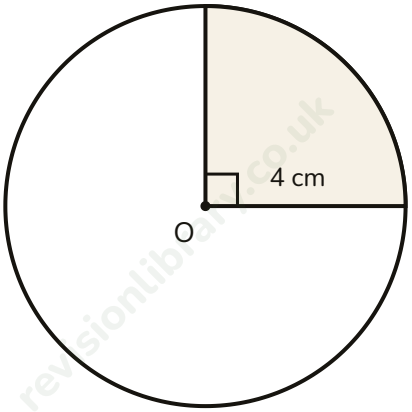


(Total for Question 4 is 3 marks)

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5 A sector of a circle has centre O, radius 4 cm and angle 90 degrees. Find the exact arc length of the sector, giving your answer in terms of π.

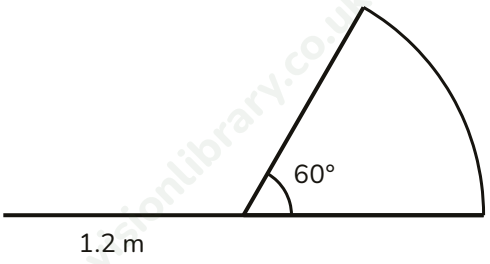
Diagram NOT accurately drawn



(Total for Question 5 is 3 marks)

6 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 π = 3.14159.

Diagram NOT accurately drawn

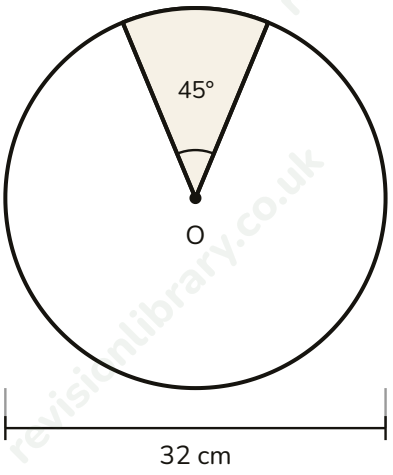


(Total for Question 6 is 3 marks)

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7 A circular pizza has a diameter of 32 cm. Fatima cuts a slice which forms a sector with an angle of 45 degrees at the centre.

Diagram NOT accurately drawn



(a) Calculate the length of the curved crust edge of the slice, giving your answer correct to 3 significant figures. **(2)**

.....

(b) Calculate the area of the slice, giving your answer correct to 3 significant figures. **(2)**

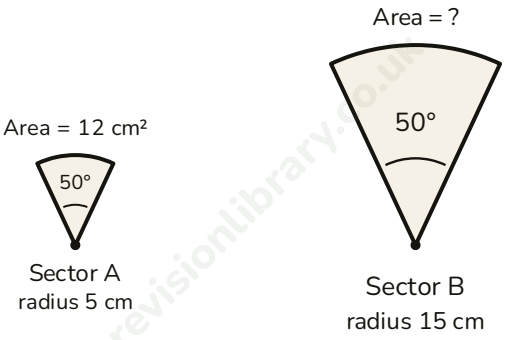
.....

(Total for Question 7 is 4 marks)

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8 Sector A has radius 5 cm and area 12 cm². Sector B has the same angle as sector A, but has radius 15 cm. Find the area of sector B. You do not need to find the angle.

Diagram NOT accurately drawn



(Total for Question 8 is 4 marks)

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Mark scheme · 5.17 Sector Areas and Arc Lengths: 30-minute Pack

Question 1

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

Question 2

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

Question 3

(60/360) x 2 x π x 6 oe	**M1**
awrt 6.28 (cm)	**A1**
Answer: 6.28 cm	

Question 4

(120/360) x 2 x π x 7 oe (arc length AB)	**M1**
their arc length + (2 x 7) (adds the two radii OA and OB)	**M1**
awrt 28.7 (cm)	**A1**
Answer: 28.7 cm	

Question 5

identifies fraction 90/360 = 1/4 oe	**B1**
(1/4) x 2 x π x 4 oe	**M1**
2pi cm cao (exact; do not accept a decimal-only answer)	**A1**
Answer: 2pi cm (= 6.28 cm to 3 s.f.)	

Question 6

use r = 0.6 m and area sector = (60/360) * π * r^2	**M1**
substitute: (1/6) * π * 0.6^2 = (1/6) * π * 0.36	**M1**
0.188495... m^2 correct to 3 dp 0.188 m²	**A1**
Answer: 0.188 m^2	

Question 7

(a) (45/360) x 2 x π x 16 oe (radius = 16 cm identified)	**M1**
(a) awrt 12.6 (cm)	**A1**
(a) Answer: 12.6 cm	
(b) (45/360) x π x 16^2 oe	**M1**
(b) awrt 101 (cm^2)	**A1**
(b) Answer: 101 cm^2	

Question 8

recognises that sectors with equal angle are similar, so areas scale with the square of the radius ratio oe	**M1**
scale factor for length = 15/5 = 3, so area scale factor = 3^2 = 9 oe	**M1**
12 x 9 oe	**M1**
108 cm² cao	**A1**
Answer: 108 cm^2	

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