5.17 Sector Areas and Arc Lengths: 1-hour Pack

EDEXCEL 1MA1 · Calculator allowed · about 60 minutes

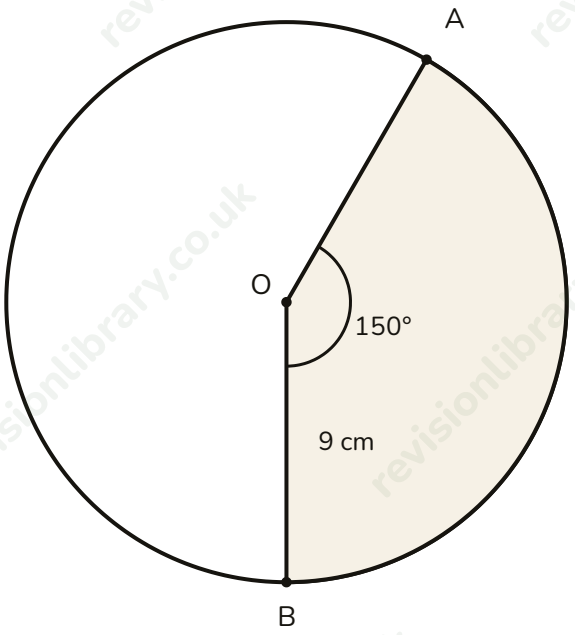
Total Marks

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

1 A sector of a circle has centre O, radius 9 cm and angle AOB = 150 degrees. Calculate the area of the sector, giving your answer to 3 significant figures.

Diagram NOT accurately drawn

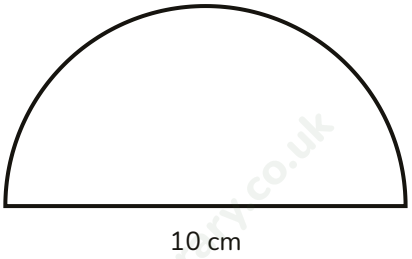


(Total for Question 1 is 3 marks)

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2 A semicircular rug has a straight edge of length 10 cm and a curved edge. The radius of the semicircle is 5 cm. Calculate the perimeter of the rug, giving your answer correct to 3 significant figures.

Diagram NOT accurately drawn

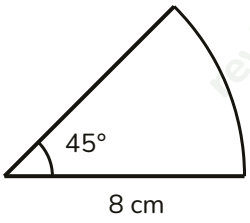


(Total for Question 2 is 3 marks)

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3 Work out the area of a sector of a circle with radius 8 cm and centre angle 45 degrees.

Diagram NOT accurately drawn

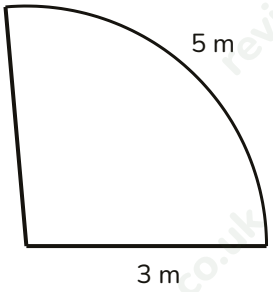


(Total for Question 3 is 2 marks)

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4 A sector has radius 3 m and arc length 5 m. Calculate the perimeter of the sector (arc plus the two radii). Give your answer correct to 3 significant figures.

Diagram NOT accurately drawn

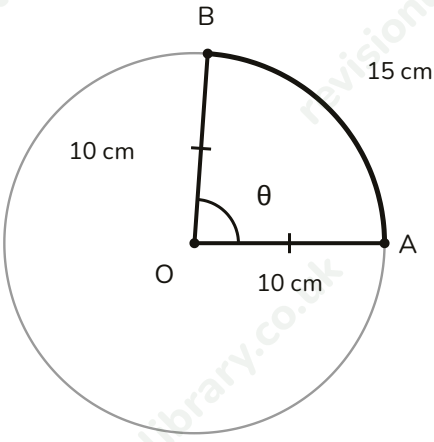


(Total for Question 4 is 2 marks)

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5 A sector of a circle has centre O and radius 10 cm. The length of the arc AB is 15 cm. Calculate the size of angle AOB, giving your answer to 1 decimal place.

Diagram NOT accurately drawn

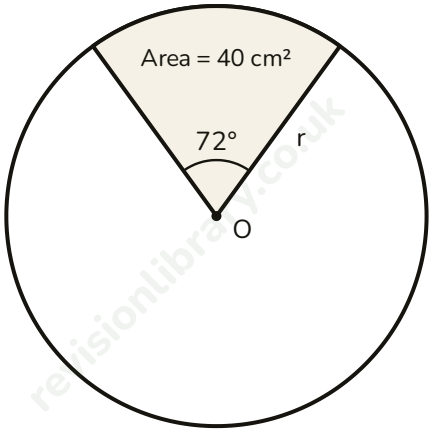


(Total for Question 5 is 3 marks)

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6 A sector of a circle has an angle at the centre of 72 degrees and an area of 40 cm². Calculate the radius r, giving your answer to 3 significant figures.

Diagram NOT accurately drawn

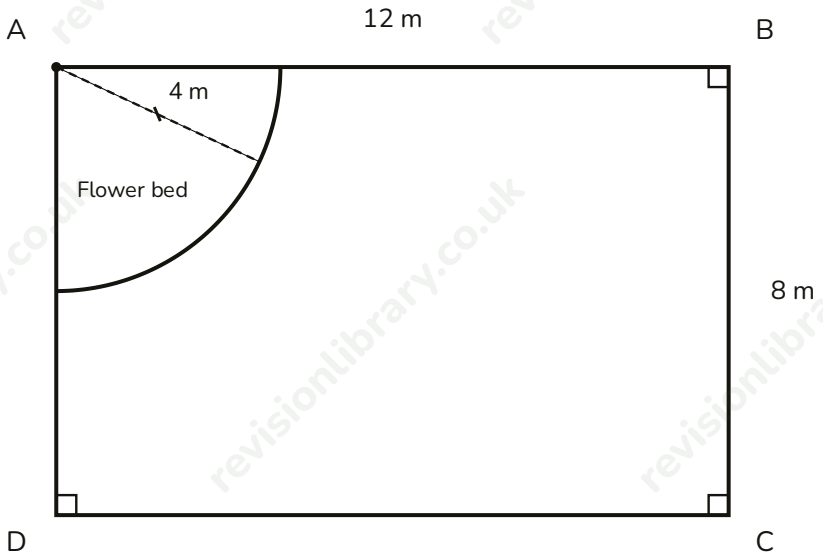


(Total for Question 6 is 3 marks)

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7 The diagram shows a rectangular garden ABCD, where AB = 12 m and BC = 8 m. A quarter-circle flower bed, with centre A and radius 4 m, is cut from the corner of the garden at A.

Diagram NOT accurately drawn



(a) Calculate the area of the flower bed, giving your answer correct to 3 significant figures. **(2)**

.....

(b) Calculate the area of the remaining garden (the rectangle with the flower bed removed), giving your answer correct to 3 significant figures. **(3)**

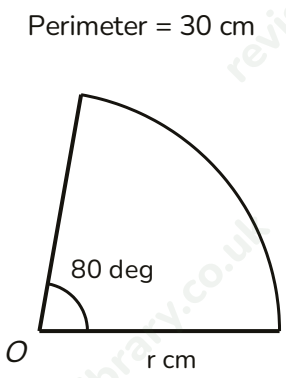
.....

(Total for Question 7 is 5 marks)

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8 A sector of a circle has radius r cm and angle 80 degrees at the centre. The perimeter of the sector is 30 cm. Calculate the value of r, giving your answer to 3 significant figures.

Diagram NOT accurately drawn

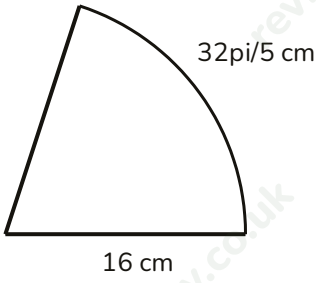


(Total for Question 8 is 3 marks)

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9 A sector of a circle has radius 16 cm. The length of its arc is 32pi/5 cm. Work out the angle of the sector.

Diagram NOT accurately drawn

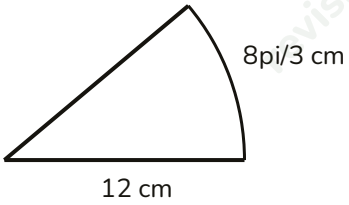


(Total for Question 9 is 3 marks)

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10 The arc length of a sector of radius 12 cm is 8pi/3 cm. Work out the area of the sector, in terms of π, without first finding the angle.

Diagram NOT accurately drawn

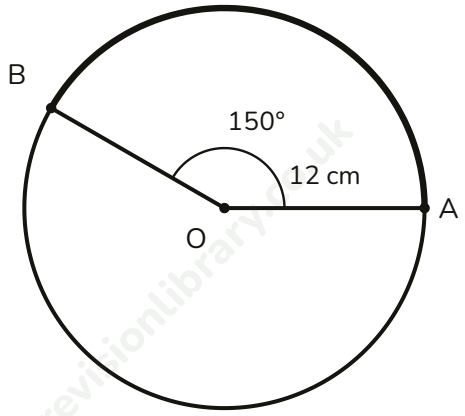


(Total for Question 10 is 3 marks)

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11 A sector of a circle has centre O, radius 12 cm and angle AOB = 150 degrees. Find the exact length of the arc AB, giving your answer in terms of π.

Diagram NOT accurately drawn

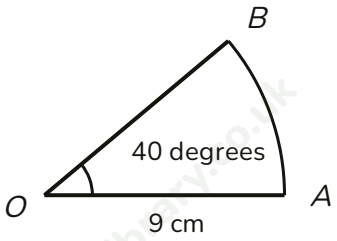


(Total for Question 11 is 2 marks)

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12 A sector of a circle has centre O, radius 9 cm and angle AOB = 40 degrees. Find the exact area of the sector, giving your answer in terms of π.

Diagram NOT accurately drawn

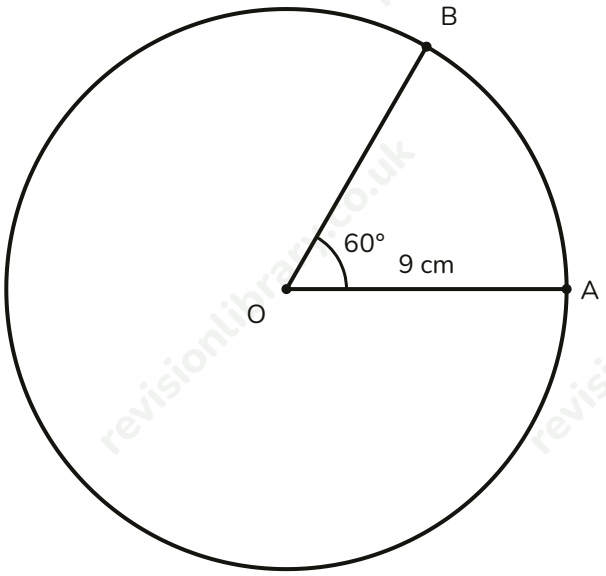


(Total for Question 12 is 3 marks)

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13 A sector of a circle has centre O, radius 9 cm and angle AOB = 60 degrees. Calculate the area of the sector, giving your answer correct to 3 significant figures.

Diagram NOT accurately drawn

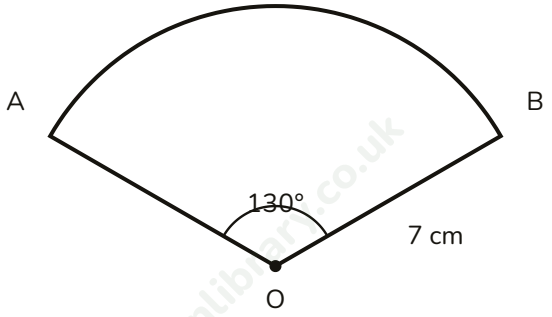


(Total for Question 13 is 3 marks)

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14 A sector of a circle has centre O, radius 7 cm and angle AOB = 130 degrees. Calculate the arc length of the sector, giving your answer correct to 3 significant figures.

Diagram NOT accurately drawn

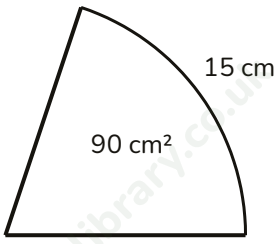


(Total for Question 14 is 4 marks)

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15 A sector has arc length 15 cm and area 90 cm². Find the radius of the circle. Give your answer correct to 3 significant figures.

Diagram NOT accurately drawn



(Total for Question 15 is 4 marks)

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Mark scheme · 5.17 Sector Areas and Arc Lengths: 1-hour Pack

A correct answer earns full marks unless the question asks for working, a method, proof or explanation.

Question 1

(150/360) x π x 9^2 oe	**M1**
(150/360) x 254.469... (correct substitution seen)	**M1**
awrt 106 (cm^2)	**A1**

Answer: 106 cm^2

Question 2

arc length = π x 5 oe, or (180/360) x 2 x π x 5	**M1**
arc length = 15.7 cm awrt (15.70796...)	**A1**
perimeter = their arc + 10 = 25.7 cm awrt, cao	**A1**

Answer: 25.7 cm (3 s.f.)

Question 3

use area = π r^2 * angle/360 or equivalent method	**M1**
8 π cm^2 cao	**A1**

Answer: 8 π cm^2 (approximately 25.133 cm^2)

Question 4

perimeter = arc + 2r = 5 + 2*3 = 11	**M1**
11.0 m cao	**A1**

Answer: 11.0 m

Question 5

2 x π x 10 (= 62.8...) (full circumference found)	**M1**
(15 / their circumference) x 360 oe (correct proportion set up)	**M1**
awrt 85.9 (degrees)	**A1**

Answer: 85.9 degrees

Question 6

40 = (72/360) x π x r^2 oe (correct equation formed)	**M1**
r^2 = 40 x 360 / (72 x π) (= 63.6...) (correct rearrangement)	**M1**
awrt 7.98 (cm)	**A1**

Answer: 7.98 cm

Question 7

(a) (90/360) x π x 4^2 oe	**M1**
(a) awrt 12.6 (m^2)	**A1**

(a) Answer: 12.6 m^2

(b) 12 x 8 (= 96) (area of rectangle found)	**M1**
(b) 96 - their (a) (correct subtraction of the flower bed area)	**M1**
(b) awrt 83.4 (m^2) ft their (a)	**A1**

(b) Answer: 83.4 m^2

Question 8

2r + (80/360) x 2 x π x r = 30 oe (correct equation formed)	**M1**
r(2 + (80/360) x 2 x π) = 30, or r x 3.396... = 30 (correct factorisation/simplification)	**M1**
awrt 8.83 (cm)	**A1**

Answer: 8.83 cm

Question 9

arc / (2 x π x 16) x 360 oe	**M1**
correct substitution and simplification	**M1**
72 degrees cao	**A1**

Answer: 72 degrees

Question 10

area = 1/2 x 12 x arc length	**M1**
1/2 x 12 x 8pi/3 oe	**M1**
16pi cm^2 cao	**A1**

Answer: 16pi cm^2

Question 11

(150/360) x 2 x π x 12 oe, or 24pi seen	**M1**
10pi (cm) cao (accept exact equivalent forms, e.g. 10 x π)	**A1**

Answer: 10pi cm

Question 12

(40/360) x π x 9^2 oe, or 81pi seen	**M1**
(1/9) x 81pi (correct simplification of the fraction of the circle)	**M1**
9pi (cm^2) cao	**A1**

Answer: 9pi cm^2

Question 13

(60/360) x π x 9^2 oe	**M1**
13.5pi or 42.41... seen	**A1**
42.4 cm^2 awrt, cao	**A1**

Answer: 42.4 cm^2 (3 s.f.)

Question 14

full circumference = 2 x π x 7 (= 43.98...) oe	**M1**
(130/360) x 2 x π x 7 oe	**M1**
15.88... seen (awrt 15.9)	**A1**
15.9 cm awrt, cao	**A1**

Answer: 15.9 cm (3 s.f.)

Question 15

use relationship A = 1/2 r s or area = 1/2 * r * arc	**M1**
substitute A = 90 and s = 15 to get 90 = 1/2 * r * 15	**M1**
solve for r: r = 90 * 2 / 15 = 12	**M1**
12.0 cm cao	**A1**

Answer: 12.0 cm

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