Circles, Arcs and Sectors - Worksheet

Skill

Group A - Area of a circle

Calculate the area of a circle using the information given:

1) Radius = $5\ cm$

2) Radius = $9.4\ m$

3) Radius = $0.6\ cm$

4) Radius = $4.566\ m$

5) Radius = $\frac{5}{9}\ cm$

6) Radius = $2\frac{4}{5}\ cm$

7) Diameter = $10\ cm$

8) Diameter = $17\ m$

9) Diameter = $0.7\ cm$

10) Diameter = $3.762\ mm$

11) Diameter = $\frac{7}{8}\ cm$

12) Diameter = $4\frac{5}{6}\ cm$

Group B - Circumference of a circle

Calculate the circumference of a circle using the information given:

1) Diameter = $8\ cm$

2) Diameter = $4.7\ cm$

3) Diameter = $0.02\ m$

4) Diameter = $7.803\ mm$

5) Diameter = $\frac{3}{8}\ m$

6) Diameter = $1\frac{5}{11}\ cm$

7) Radius = $12\ cm$

8) Radius = $5.2\ m$

9) Radius = $0.4\ km$

10) Radius = $5.999\ m$

11) Radius = $\frac{9}{13}\ cm$

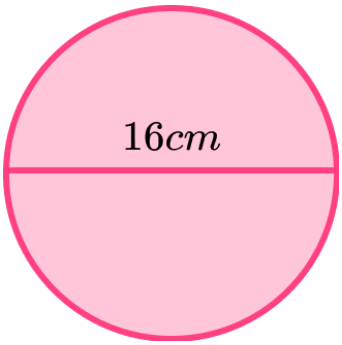
12) Radius = $3\frac{2}{5}\ mm$

Circles, Arcs and Sectors - Worksheet

Group C - Calculating properties of circles

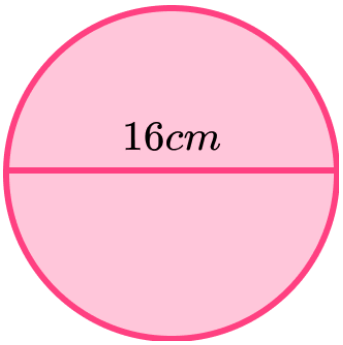
Calculate the properties of the circle using the information provided. Give each answer to 3 significant figures:

1)



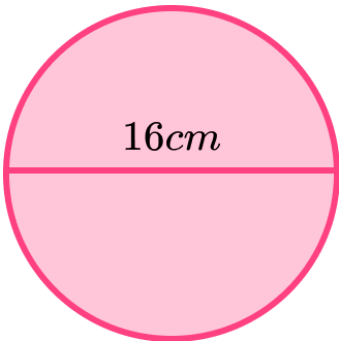
What is the radius of the circle?

2)



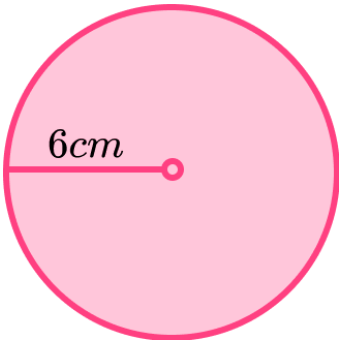
What is the area of the circle?

3)



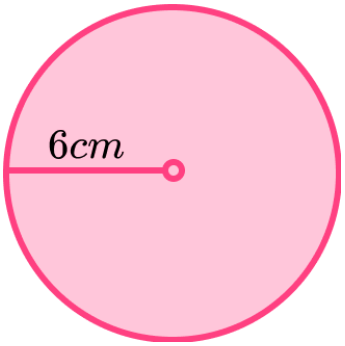
What is the circumference of the circle?

4)



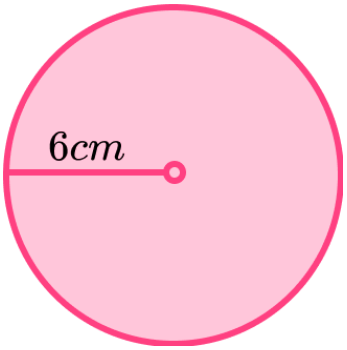
What is the diameter of the circle?

5)



What is the area of the circle?

6)



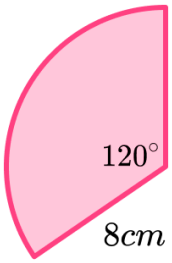
What is the circumference of the circle?

Circles, Arcs and Sectors - Worksheet

Group D - Calculating properties of sectors

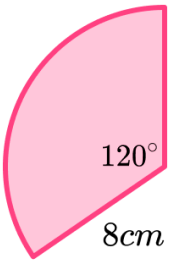
Calculate the properties of the circle using the information provided. Give each answer to 3 significant figures:

1)



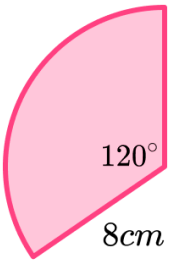
What is the arc length of the sector?

2)



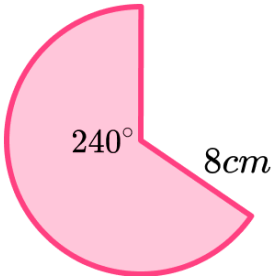
What is the area of the sector?

3)



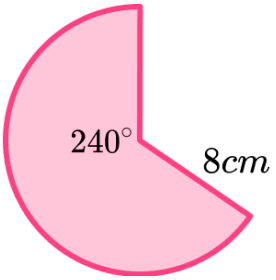
What is the perimeter of the sector?

4)



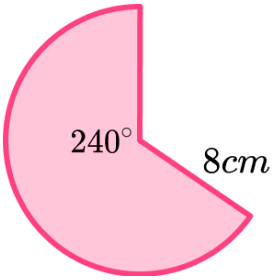
What is the arc length of the sector?

5)



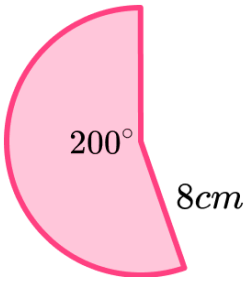
What is the area of the sector?

6)



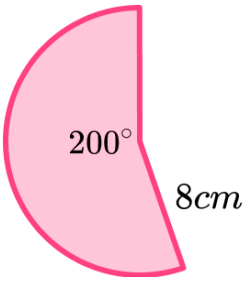
What is the perimeter of the sector?

7)



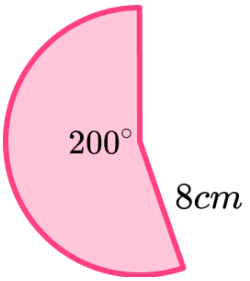
What is the arc length of the sector?

8)



What is the area of the sector?

9)



What is the perimeter of the sector?

Circles, Arcs and Sectors - Worksheet

Group E - Reversing the process

Work out the properties of the circle, given the circumference or area. Give each answer to 3 significant figures.

A circle has a circumference of $100\pi\ cm$. Calculate:

1) Diameter **2)** Radius **3)** Area

A circle has a circumference of $70\ cm$. Calculate:

4) Diameter **5)** Radius **6)** Area

A circle has an area of $100\pi\ cm^2$. Calculate:

7) Radius **8)** Diameter **9)** Circumference

A circle has an area of $70\ cm^2$. Calculate:

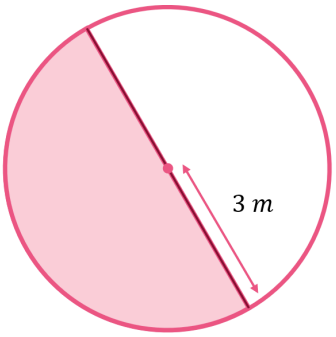
10) Radius **11)** Diameter **12)** Circumference

Circles, Arcs and Sectors - Worksheet

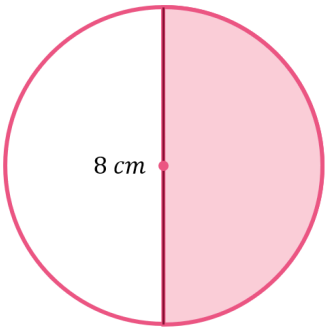
Group F - The area of a segment

Calculate the area of each segment shaded. Round each solution to 2 decimal places:

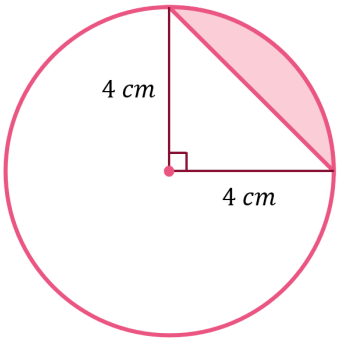
1)



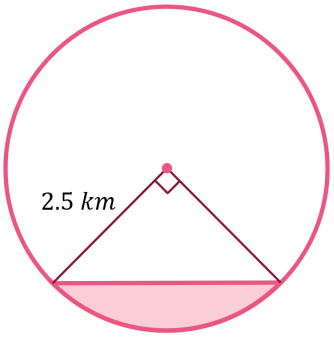
2)



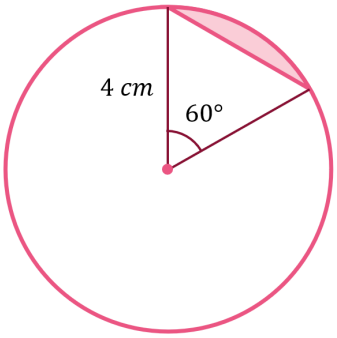
3)



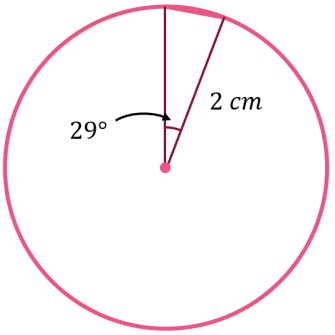
4)



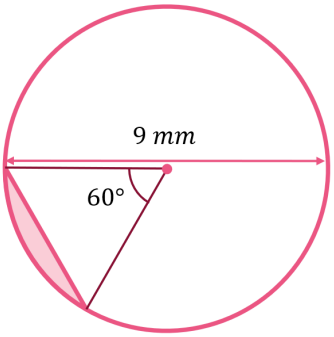
5)



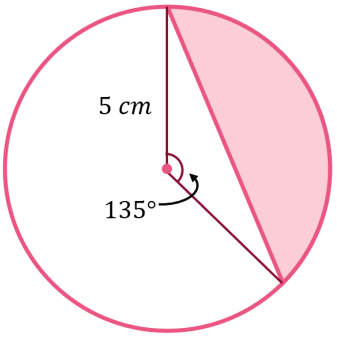
6)



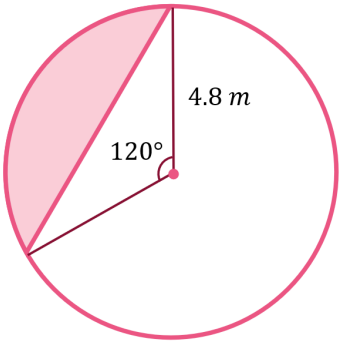
7)



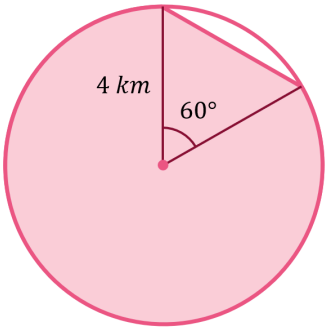
8)



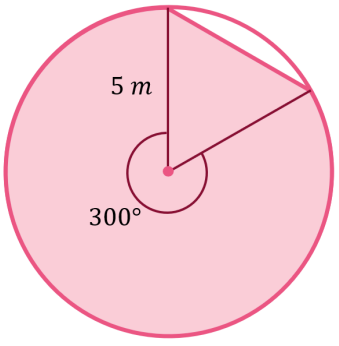
9)



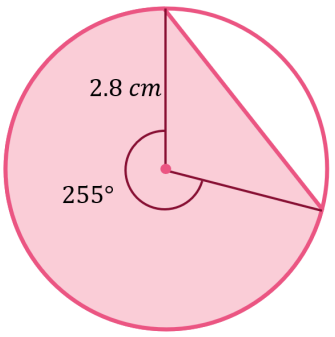
10)



11)



12)



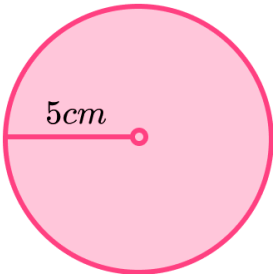
Circles, Arcs and Sectors - Worksheet

Applied

Write answers to 3 significant figures when appropriate.

1) A semicircle has a perimeter of $90cm$. Calculate its diameter.

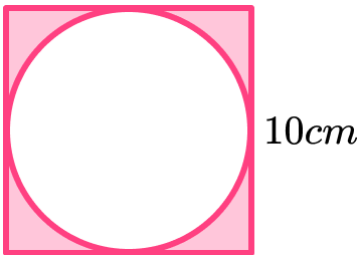
2) Here is a circle with radius $r = 5\ cm$.



a) Calculate the circumference of the circle. Leave your answer in terms of π.

b) Calculate the area of the circle. Leave your answer in terms of π.

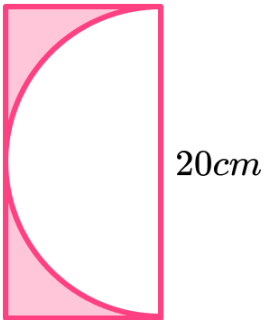
3) The shape below is a circle inscribed in a square. The side length of the square is $10cm$.



(a) What is the radius of the circle?

(b) Calculate the area of the shaded region.

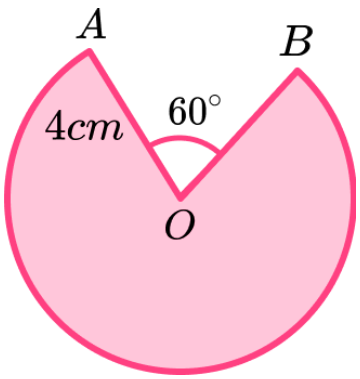
4) The shape below is made up of a semicircle and a rectangle. The diameter of the circle is $20cm$.



What is the area of the shaded region?

Circles, Arcs and Sectors - Exam Questions

1) AOB forms a sector with centre O.



The acute angle at AOB is 60^o and the length OA = 4cm.

(a) What is the area of sector AOB in terms of π?

.....cm^2

(3)

(b) What is the arc length of sector AOB? Give your answer to 2 decimal places.

.....cm

(3)

(c) What is the perimeter of the sector AOB?
Give your answer to 3 significant figures.

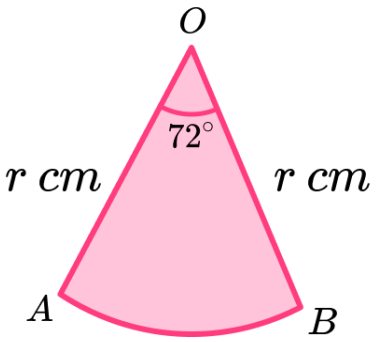
.....cm

(2)

(8 marks)

Circles, Arcs and Sectors - Exam Questions

2) AOB is a sector with angle 72^o.



The perimeter of AOB is $40cm$.
Calculate the value of r. Give your answer to 3 significant figures.

.....
(4 marks)

---

3) (a) The area of circle C is $49\pi\ cm^2$. What is the radius of the circle?

.....cm
(1)

Circles, Arcs and Sectors - Exam Questions

(b) What is the area of a semicircle S with the same radius as circle C?
Give your answer in terms of π.

.....cm^2
(2)

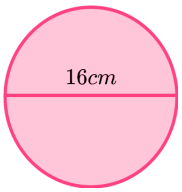
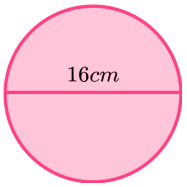
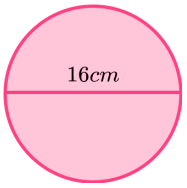
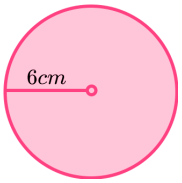
(c) What is the perimeter of the semicircle S?
Give your answer to 3 significant figures.

.....cm
(5)
(8 marks)

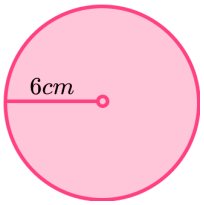
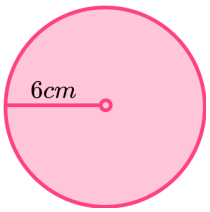
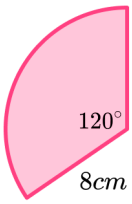
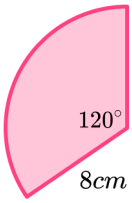
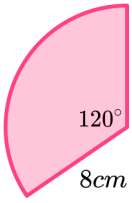
Circles, Arcs and Sectors - Answers

	Question	Answer
	Skill Questions	
Group A	Calculate the area of a circle using the information given:	
	1) Radius = $5\ cm$	**1)** $25\pi\ cm^2$ **or** $78.5\ cm^2\ (1dp)$
	2) Radius = $9.4\ m$	**2)** $\frac{2209}{25}\pi\ m^2$ **or** $227.6\ m^2\ (1dp)$
	3) Radius = $0.6\ cm$	**3)** $\frac{9}{25}\pi\ cm^2$ **or** $1.13\ cm^2\ (2dp)$
	4) Radius = $4.566\ m$	**4)** $20.848356\pi\ m^2$ **or** $65.50\ m^2\ (2dp)$
	5) Radius = $\frac{5}{9}\ cm$	**5)** $\frac{25}{81}\pi\ cm^2$ **or** $0.97\ cm^2\ (2dp)$
	6) Radius = $2\frac{4}{5}\ cm$	**6)** $\frac{196}{25}\pi\ cm^2$ **or** $24.63\ cm^2\ (2dp)$
	7) Diameter = $10\ cm$	**7)** $25\pi\ cm^2$ **or** $78.5\ cm^2\ (1dp)$
	8) Diameter = $17\ m$	**8)** $\frac{289}{4}\pi\ m^2$ **or** $226.98\ m^2\ (2dp)$
	9) Diameter = $0.7\ cm$	**9)** $\frac{49}{400}\pi\ cm^2$ **or** $0.38\ cm^2\ (2dp)$
	10) Diameter = $3.762\ mm$	**10)** $3.538161\pi\ mm^2$ **or** $11.12\ mm^2\ (2dp)$
	11) Diameter = $\frac{7}{8}\ cm$	**11)** $\frac{49}{256}\pi\ cm^2$ **or** $0.60\ cm^2\ (2dp)$
	12) Diameter = $4\frac{5}{6}\ cm$	**12)** $\frac{841}{144}\pi\ cm^2$ **or** $18.35\ cm^2\ (2dp)$
Group B	Calculate the circumference of a circle using the information given:	
	1) Diameter = $8\ cm$	**1)** $8\pi\ cm$ **or** $25.1\ cm\ (1dp)$
	2) Diameter = $4.7\ cm$	**2)** $4.7\pi\ cm$ **or** $14.77\ cm\ (2dp)$
	3) Diameter = $0.02\ m$	**3)** $0.02\pi\ m$ **or** $0.063\ m\ (3dp)$
	4) Diameter = $7.803\ mm$	**4)** $7.803\pi\ mm$ **or** $24.51\ mm\ (2dp)$
	5) Diameter = $\frac{3}{8}\ m$	**5)** $\frac{3}{8}\pi\ m$ **or** $1.18\ m\ (2dp)$
	6) Diameter = $1\frac{5}{11}\ cm$	**6)** $1\frac{5}{11}\pi\ cm$ **or** $4.57\ cm\ (2dp)$

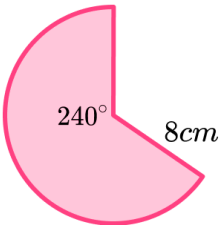
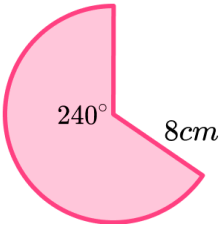
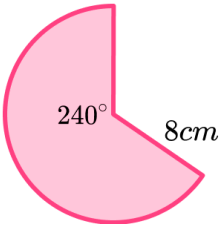
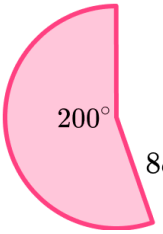
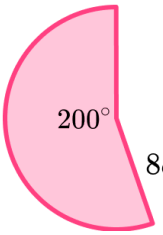
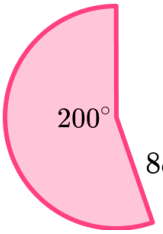
Circles, Arcs and Sectors - Answers

Group B contd	**7)** Radius = $12\ cm$ **8)** Radius = $5.2\ m$ **9)** Radius = $0.4\ km$ **10)** Radius = $5.999\ m$ **11)** Radius = $\frac{9}{13}\ cm$ **12)** Radius = $3\frac{2}{5}\ mm$	**7)** $24\pi\ cm$ **or** $75.40\ cm\ (2dp)$ **8)** $10.4\pi\ m$ **or** $32.67\ m\ (2dp)$ **9)** $0.8\pi\ km$ **or** $2.51\ km\ (2dp)$ **10)** $11.998\pi\ m$ **or** $37.69\ m\ (2dp)$ **11)** $\frac{18}{13}\pi\ cm$ **or** $4.35\ cm\ (2dp)$ **12)** $\frac{34}{5}\pi\ mm$ **or** $21.36\ mm\ (2dp)$
Group C	Calculate the properties of the circle using the information provided. Give each answer to 3 significant figures: **1)**  What is the radius of the circle? **2)**  What is the area of the circle? **3)**  What is the circumference of the circle? **4)**  What is the diameter of the circle?	**1)** $8cm$ **2)** $201\ cm^2$ **3)** $50.3cm$ **4)** $12cm$

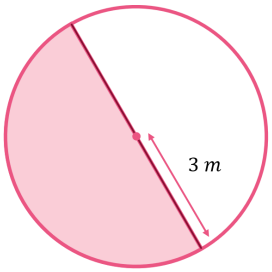
Circles, Arcs and Sectors - Answers

Group C contd	**5)**  What is the area of the circle? **6)**  What is the circumference of the circle?	**5)** $113\ cm^2$ **6)** $37.7cm$
Group D	Calculate the properties of the circle using the information provided. Give each answer to 3 significant figures: **1)**  What is the arc length of the sector? **2)**  What is the area of the sector? **3)**  What is the perimeter of the sector?	**1)** $16.8\ cm$ **2)** $67.0cm^2$ **3)** $32.8cm$

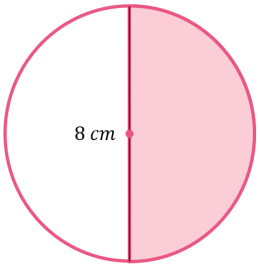
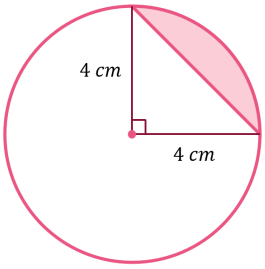
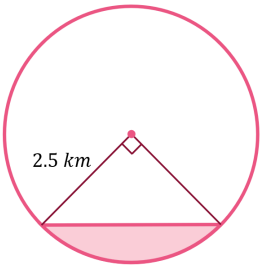
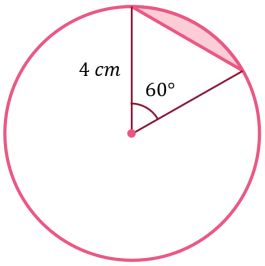
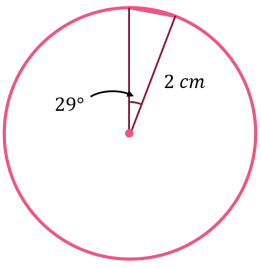
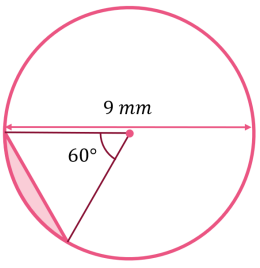
Circles, Arcs and Sectors - Answers

Group D contd	**4)**  What is the arc length of the sector?	**4)** $33.5cm$
	5)  What is the area of the sector?	**5)** $134cm^2$
	6)  What is the perimeter of the sector?	**6)** $49.5cm$
	7)  What is the arc length of the sector?	**7)** $27.9cm$
	8)  What is the area of the sector?	**8)** $112cm^2$
	9)  What is the perimeter of the sector?	**9)** $43.9cm$

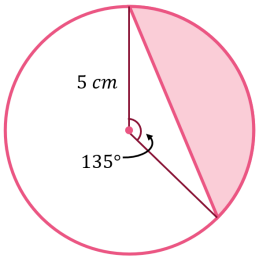
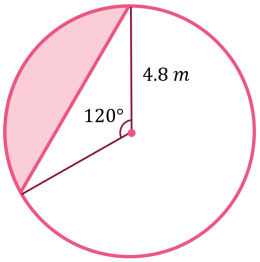
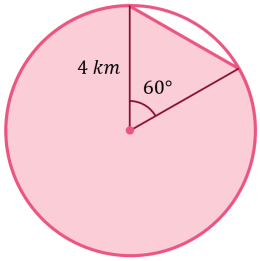
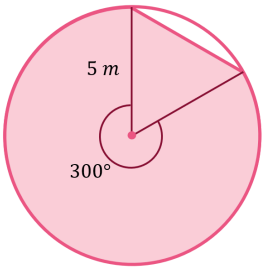
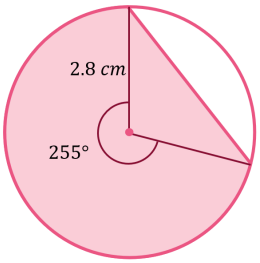
Circles, Arcs and Sectors - Answers

Group E	Work out the properties of the circle, given the circumference or area. Give each answer to 3 significant figures. A circle has a circumference of $100\pi\ cm$. Calculate: **1)** Diameter **2)** Radius **3)** Area A circle has a circumference of $70\ cm$. Calculate: **4)** Diameter **5)** Radius **6)** Area A circle has an area of $100\pi\ cm^2$. Calculate: **7)** Radius **8)** Diameter **9)** Circumference A circle has an area of 70 cm^2. Calculate: **10)** Radius **11)** Diameter **12)** Circumference	 **1)** $100cm$ **2)** $50cm$ **3)** $7854cm^2$ **4)** $22.3cm$ **5)** $11.1cm$ **6)** $387cm^2$ **7)** $10cm$ **8)** $20cm$ **9)** $62.8cm$ **10)** $4.7cm$ **11)** $9.4cm$ **12)** $29.5cm$
Group F	Calculate the area of each segment shaded. Round each solution to 2 decimal places: **1)** 	 **1)** $14.14m^2$

Circles, Arcs and Sectors - Answers

Group F contd	**2)** 	**2)** $25.13cm^2$
	3) 	**3)** $4.57cm^2$
	4) 	**4)** $1.78km^2$
	5) 	**5)** $1.45cm^2$
	6) 	**6)** $0.04cm^2$
	7) 	**7)** $1.83mm^2$

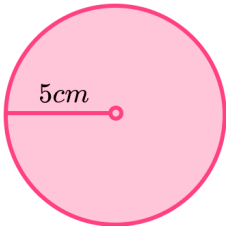
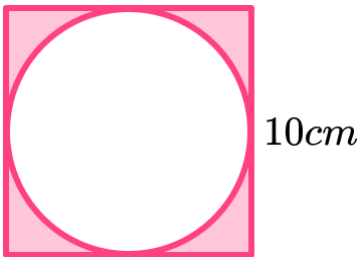
Circles, Arcs and Sectors - Answers

Group F contd	**8)** 	**8)** $20.61cm^2$
	9) 	**9)** $14.15m^2$
	10) 	**10)** $48.82km^2$
	11) 	**11)** $76.28m^2$
	12) 	**12)** $21.23cm^2$

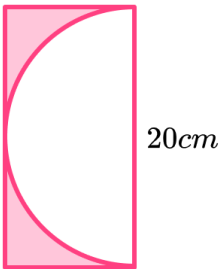
Circles, Arcs and Sectors- Answers

Applied

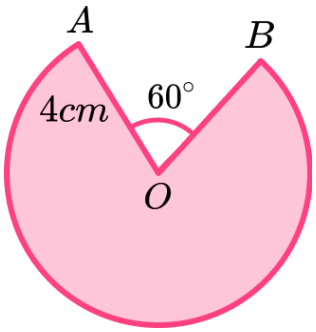
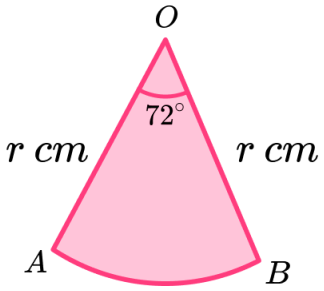
Write answers to 3 significant figures when appropriate.

	Questions	Answers
1)	A semicircle has a perimeter of $90cm$. Calculate its diameter.	$90 = d + \left(\frac{180}{360} \times \pi \times d\right)$ $90 = d(1 + \frac{1}{2}\pi)$ $d = 35\ cm$
2)	Here is a circle with radius $r = 5\ cm$.  	
(a)	Calculate the circumference of the circle. Leave your answer in terms of π.	$10\pi\ cm$
(b)	Calculate the area of the circle. Leave your answer in terms of π.	$25\pi\ cm^2$
3)	The shape below is a circle inscribed in a square. The side length of the square is $10cm$.  	
(a)	What is the radius of the circle?	$5\ cm$
(b)	Calculate the area of the shaded region.	Area of Square = $100\ cm^2$ Area of Circle = $25\pi\ cm^2$ Area of Shaded = $100 - 25\pi$ Area of Shaded =$21.5\ cm^2\ (3sf)$

Circles, Arcs and Sectors- Answers

4)	The shape below is made up of a semicircle and a rectangle. The diameter of the circle is $20cm$.  What is the area of the shaded section?	Area of Rectangle: $20 \times 10 = 200\ cm^2$ Area of Semicircle: $\frac{180}{360} \times \pi \times 10^2 = 50\pi\ cm^2$ Shaded area: $200 - 50\pi = 42.9\ cm^2\ (3sf)$

Circles, Arcs and Sectors- Mark Scheme

1)	AOB forms a sector with centre O.  The acute angle at AOB is 60^o and the length OA = $4cm$.		
(a)	What is the area of sector AOB in terms of π?	300 **seen** $\frac{300}{360} \times \pi \times 4^2$ **oe** $\frac{40}{3}\pi$	**(1)** **(1)** **(1)**
(b)	What is the arc length of sector AOB? Give your answer to 2 decimal places.	$\frac{300}{360} \times \pi \times 8$ **oe** $20.94395102...$ $20.94\ cm$	**(1)** **(1)** **(1)**
(c)	What is the perimeter of the sector AOB? Give your answer to 3 significant figures.	$20.9 + 8$ **oe** 28.9	**(1)** **(1)**
2)	AOB is a sector with angle 72^o.  The perimeter of AOB is $40cm$ Calculate the value of r. Give your answer to 3 significant figures.	$2r + (\frac{72}{360} \times \pi \times 2r) = 40$ **oe** $2r + \frac{2r}{5}\pi = 40$ $200 = 10r + 2r\pi$ $200 = r(10 + 2\pi)$ $r = 12.2826091...$ $12.3\ ft$	**(1)** **(1)** **(1)** **(1)**

Circles, Arcs and Sectors- Mark Scheme

3)	**(a)**	The area of circle C is $49\pi\ cm^2$. What is the radius of the circle?	$7\ cm$	**(1)**
	(b)	What is the area of a semicircle S with the same radius as circle C? Give your answer in terms of π.	$\frac{180}{360} \times \pi \times 7^2$ **oe** $\frac{49}{2}\pi\ cm^2$	**(1)** **(1)**
	(c)	What is the perimeter of the semicircle S? Give your answer to 3 significant figures.	$\frac{180}{360} \times \pi \times 2 \times 7$ **oe** 7π **oe** $7\pi + 2 \times 7$ **oe** $35.99114858...$ $36.0\ cm\ (3sf)$	**(1)** **(1)** **(1)** **(1)** **(1)**