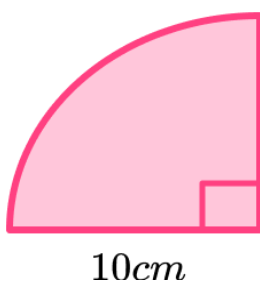**THIRD SPACE LEARNING**

Arcs and Sectors - Worksheet

Skill

Group A - Arc lengths

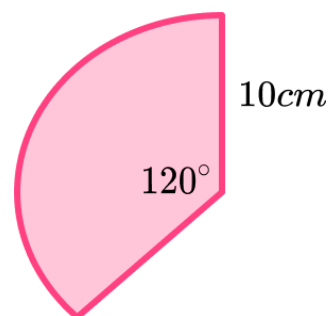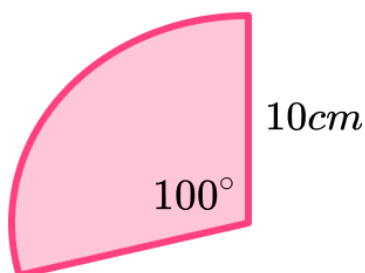Find the arc length of each sector. Give your answer in terms of π:

1)

$10cm$

2)

$20cm$

3)

$10cm$

$120°$

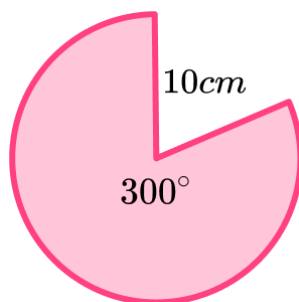**4)**
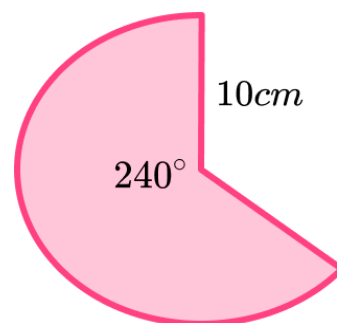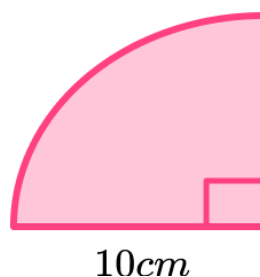
$10cm$

$100°$

5)

$10cm$

$300°$

6)

$10cm$

$240°$

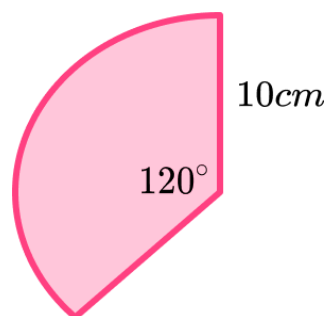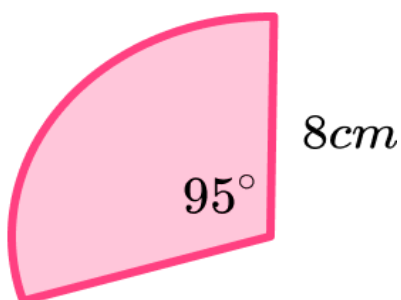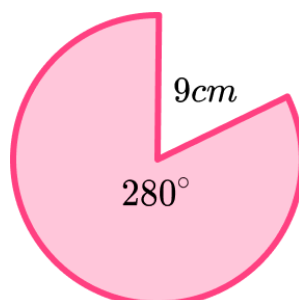Find the arc length of each sector. Give your answer to 3 significant figures:

7)

$10cm$

8)

$20cm$

9)

$10cm$

$120°$

10)

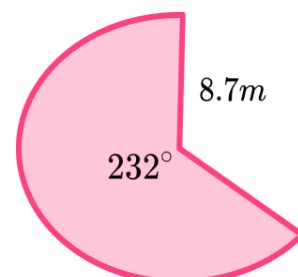$8cm$

$95°$

11)

$9cm$

$280°$

12)

$8.7m$

$232°$

Arcs and Sectors - Worksheet

Group B - Area and perimeter of sectors

Find the area of each sector. Give your answer in terms of π:
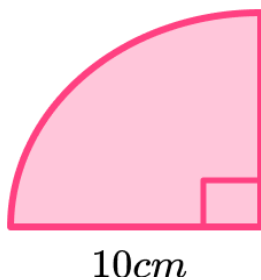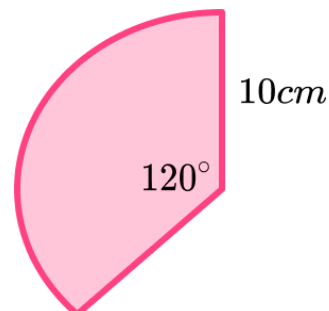
1)

$10cm$

2)

$20cm$

3)

$10cm$

$120°$

4)

$10cm$

$100°$

5)

$10cm$

$300°$

6)

$10cm$

$240°$

Find the perimeter of each sector. Give your answer to 3 significant figures:

7)

$10cm$

8)

$20cm$

9)

$10cm$

$120°$

10)

$8cm$

$95°$

11)

$9cm$

$280°$

12)

$8.7m$

$232°$

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2
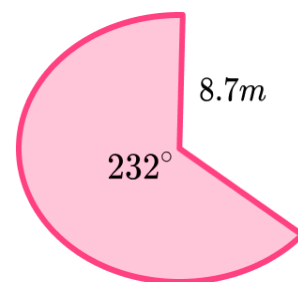
Arcs and Sectors - Worksheet

Group C - Arcs and sectors problem solving questions

Find the radius of each sector using the information provided:

1) Arc Length: $7\pi cm$

$60°$

xcm
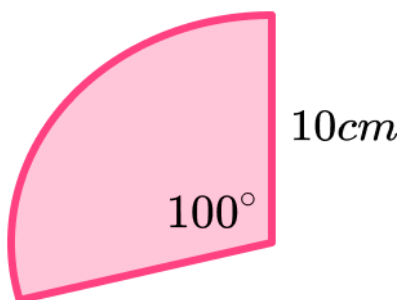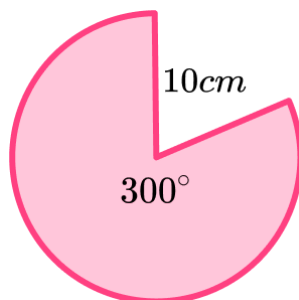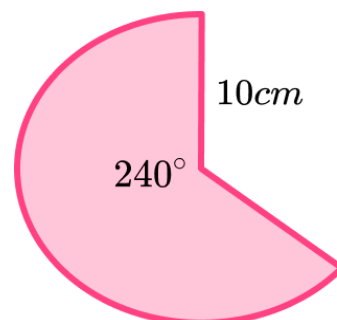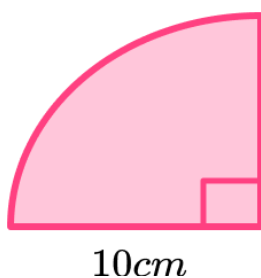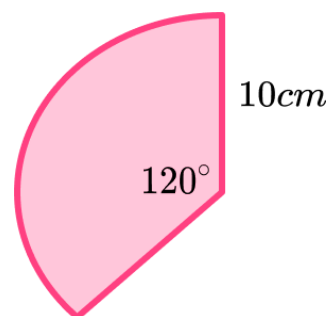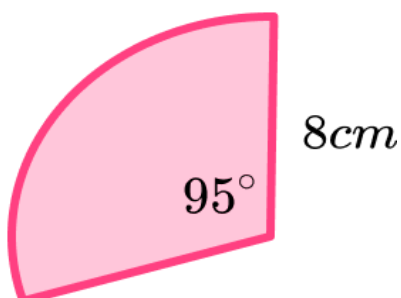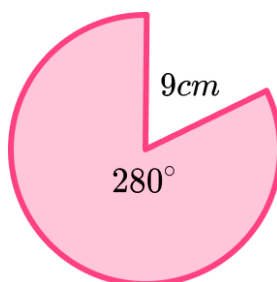
2) Arc Length: $10\pi cm$
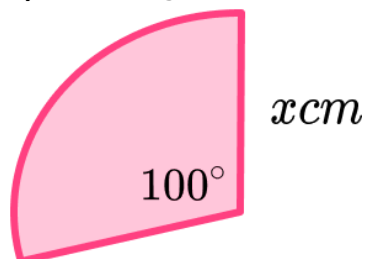
$100°$

xcm

3) Sector Area: $180\pi cm^2$
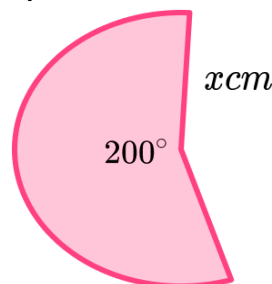
$200°$

xcm

Find the radius of each sector using the information provided. Give each answer to 2 decimal places:

4) Arc Length: $4\pi cm$

$9cm$

$x°$

5) Arc Length: $6\pi cm$

$9cm$

$x°$

6) Sector Area: $6\pi cm^2$

$3cm$

$x°$

Find the missing values. Give each answer to 3 significant figures:

7)
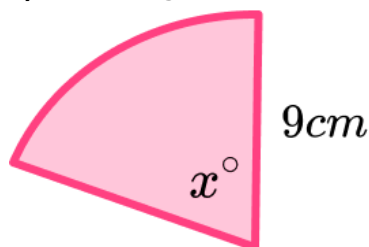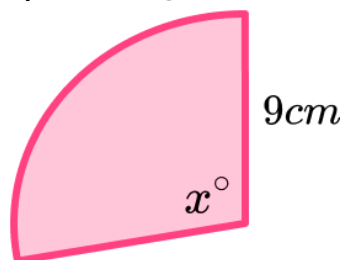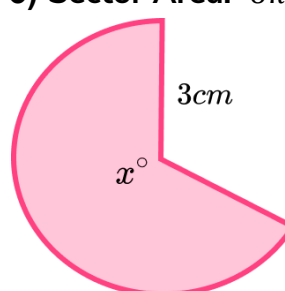
Radius: $5\ cm$

Angle of Sector: 72°

Arc Length: $2\pi\ cm$

Perimeter:

Area of Sector:

8)

Angle of Sector: 150°

Arc Length: $26.18\ cm$

Area of Sector: $130.9\ cm^2$

Radius:

Perimeter:

9)

Angle of Sector: 225°

Arc Length: $25\pi\ cm$

Perimeter: $118.5\ cm$

Radius:

Area of Sector:

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Arcs and Sectors - Worksheet

Applied

1) James is calculating the perimeter of the sector shown below.

$20cm$

$30°$
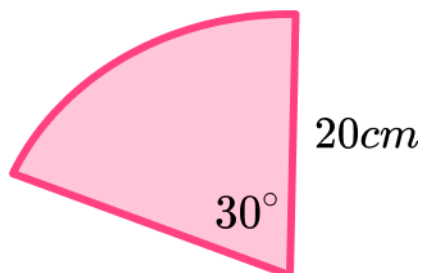
Perimeter $= \frac{30}{360} \times 2 \times \pi \times 20$

(a) What mistake has James made with his calculation?

(b) Calculate the actual perimeter of the sector.

Peter is calculating the area of the same sector.
He writes: Area $= \frac{30}{360} \times \pi \times 20$

(c) What mistake has Peter made with his calculation?

(d) Calculate the actual area of the sector.

2) These two sectors have the same area:

$10°$

$48cm$

xcm

$240°$
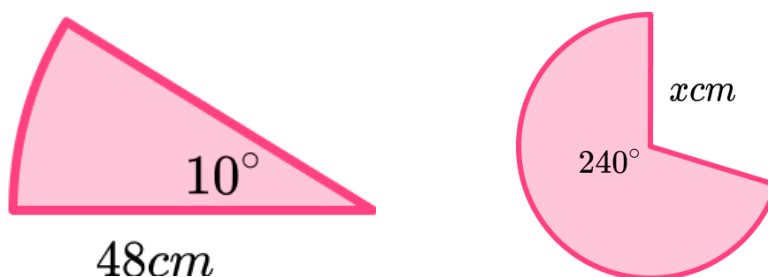
Calculate the radius of the sector on the right, labelled x.

3) A semi circle has a perimeter of $80cm$. Given that $d = 2r$, calculate the diameter of the semicircle to 1 decimal place.

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4

Arcs and Sectors - Exam Questions

1) The diagram shows an equilateral triangle ABC with sides of $6cm$.

P is the midpoint of AB

Q is the midpoint of AC

APQ is a sector of a circle with centre A.

B

P $6cm$

A C

Q
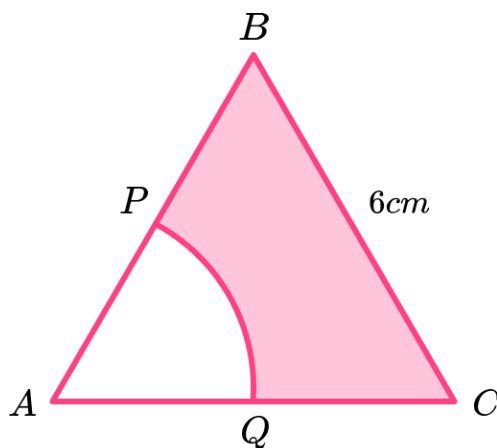
Calculate the area of the shaded region to 3 significant figures.

....
(7 marks)

Arcs and Sectors - Exam Questions

2)   The sector of a circle with centre O has a radius of $80cm$. The two points A and B are connected by an arc and a chord.

As angle $AOB = 35^o$, calculate the area of the shaded region to 3 significant figures.

. . . .

(6 marks)
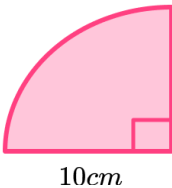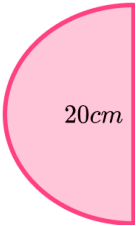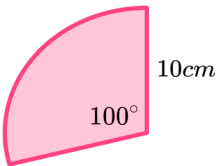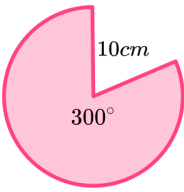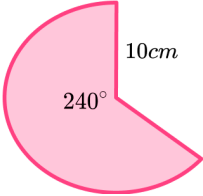
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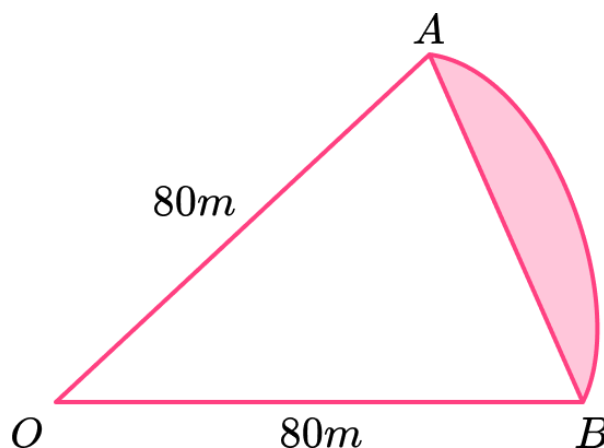
Arcs and Sectors - Exam Questions

3)   The major arc length of the circle below is $31.1cm$.
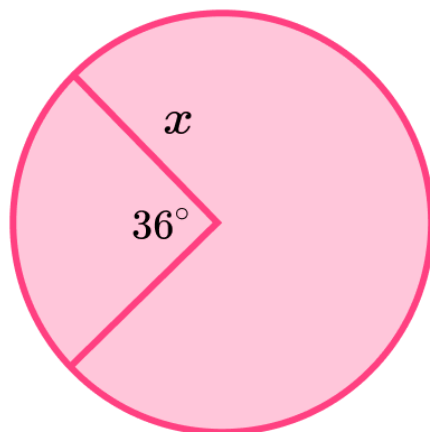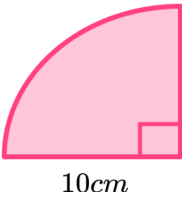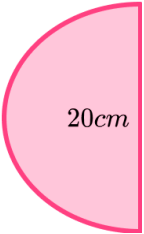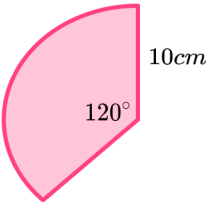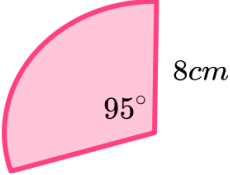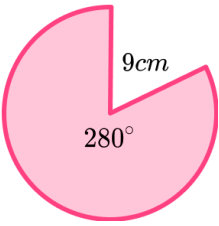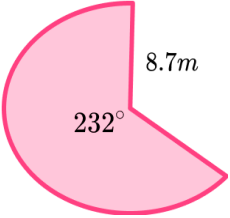
Find the length of x, the radius of the circle.
Give your answer to 1 decimal place.

(4 marks)

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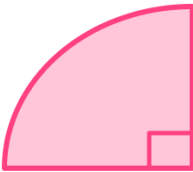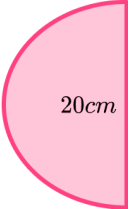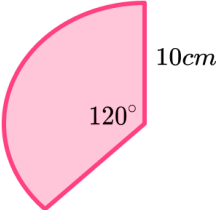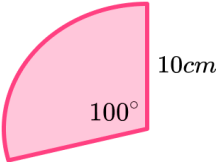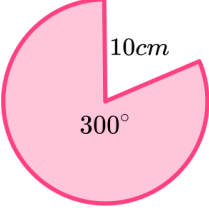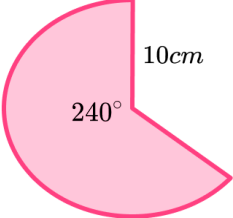
Arcs and Sectors - Answers

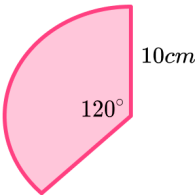|	Question	Answer
	Skill Questions	
Group A	Find the arc length of each sector. Give your answer in terms of π:	
	1) $10cm$	**1)** $5\pi \ cm$
	2) $20cm$	**2)** $10\pi \ cm$
	3) $10cm$ $120°$	**3)** $\frac{20}{3}\pi \ cm$
	4) $10cm$ $100°$	**4)** $\frac{50}{9}\pi cm$
	5) $10cm$ $300°$	**5)** $\frac{50}{3}\pi cm$
	6) $10cm$ $240°$	**6)** $\frac{40}{3}\pi cm$

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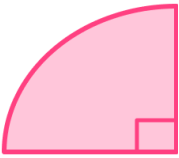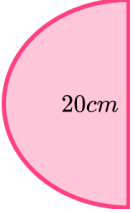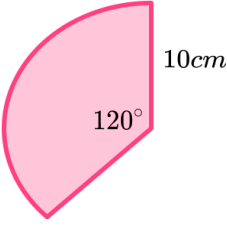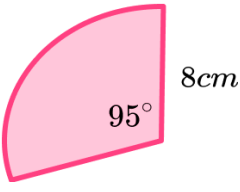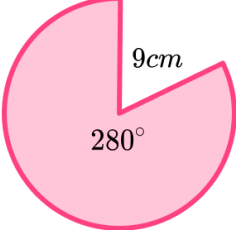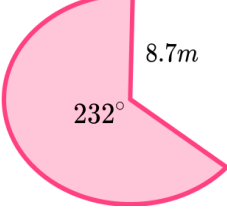
Arcs and Sectors - Answers

Group A contd	Find the arc length of each sector. Give your answer to 3 significant figures:	
	7) 10cm	**7)** $15.7 cm$
	8) 20cm	**8)** $31.4 cm$
	9) 10cm 120°	**9)** $20.9 cm$
	10) 8cm 95°	**10)** $13.3 cm$
	11) 9cm 280°	**11)** $44.0 cm$
	12) 8.7m 232°	**12)** $35.2 cm$

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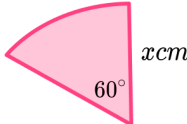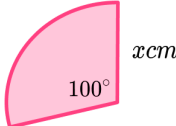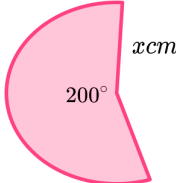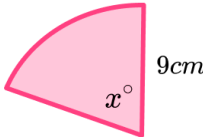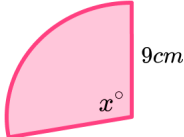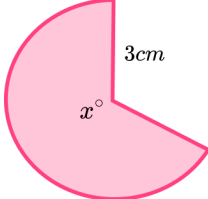
Arcs and Sectors - Answers

Group B	Find the area of each sector. Give your answer in terms of π:	
	1) 10cm	**1)** $25\pi cm^2$
	2) 20cm	**2)** $50\pi\ cm^2$
	3) 10cm 120°	**3)** $\frac{100}{3}\pi\ cm^2$
	4) 10cm 100°	**4)** $\frac{250}{9}\pi\ cm^2$
	5) 10cm 300°	**5)** $\frac{250}{3}\pi\ cm^2$
	6) 10cm 240°	**6)** $\frac{200}{3}\pi\ cm^2$

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Arcs and Sectors - Answers

Group B contd	Find the perimeter of each sector. Give your answer to 3 significant figures:	
	7) 10cm	**7)** $35.7cm$
	8) 20cm	**8)** $51.4cm$
	9) 10cm 120°	**9)** $40.9cm$
	10) 8cm 95°	**10)** $29.3cm$
	11) 9cm 280°	**11)** $62.0cm$
	12) 8.7m 232°	**12)** $52.6cm$
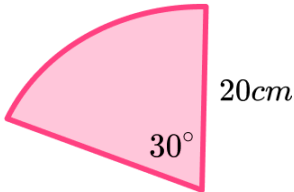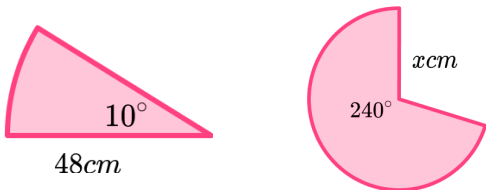
Arcs and Sectors - Answers

Group C	Find the radius of each sector using the information provided:	
	1) **Arc Length:** $7\pi cm$	**1)** $21cm$
	xcm $60°$	
	2) **Arc Length:** $10\pi cm$	**2)** $18cm$
	xcm $100°$	
	3) **Sector Area:** $180\pi cm^2$	**3)** $18cm$
	xcm $200°$	
	Find the radius of each sector using the information provided. Give each answer to 2 decimal places:	
	4) **Arc Length:** $4\pi cm$	**4)** 80°
	$9cm$ $x°$	
	5) **Arc Length:** $6\pi cm$	**5)** 120°
	$9cm$ $x°$	
	6) **Sector Area:** $6\pi cm^2$	**6)** 240°
	$3cm$ $x°$	

Arcs and Sectors - Answers

Group C contd	Find the missing values. Give each answer to 3 significant figures:	
	7) Radius: $5\,cm$ Angle of Sector: 72° Arc Length: $2\pi\,cm$ **Perimeter:** **Area of Sector:**	**7)** **Perimeter:** $16.3cm$ **Area of Sector:** $15.7cm^2$
	8) Angle of Sector: 150° Arc Length: $26.18\,cm$ Area of Sector: $130.9\,cm^2$ **Radius:** **Perimeter:**	**8)** **Radius:** $10.0cm$ **Perimeter:** $46.2cm$
	9) Angle of Sector: 225° Arc Length: $25\pi\,cm$ Perimeter: $118.5\,cm$ **Radius:** **Area of Sector:**	**9)** **Radius:** $20.0cm$ **Area of Sector:** $785\,cm^2$

Arcs and Sectors - Answers

	Question	Answer
	Applied Questions	
1)	James is calculating the perimeter of the sector shown below. $20cm$ $30°$ Perimeter = $\frac{30}{360} \times 2 \times \pi \times 20$	
	a) What mistake has James made with his calculation?	**a)** He has not added the two radii to the perimeter
	b) Calculate the actual perimeter of the sector to 2 decimal places. Peter is calculating the area of the same sector. He writes: Area = $\frac{30}{360} \times \pi \times 20$.	**b)** $\left(\frac{30}{360} \times 2 \times \pi \times 20\right) + 20 + 20$ $= 50.47\ cm$
	c) What mistake has Peter made with his calculation?	**c)** The radius (20) should be squared
	d) Calculate the actual area of the sector.	**d)** $\left(\frac{30}{360} \times \pi \times 20^2\right)$ $= \frac{100}{3}\pi\ cm^2$
2)	These two sectors have the same area: $10°$ $48cm$ xcm $240°$ Calculate the radius of the sector on the right, labelled x.	(L) Area of sector = 64π (R) Area of sector = $\frac{240}{360}\pi x^2$ $64\pi = \frac{240}{360}\pi x^2$ $x = 4\sqrt{6}\ cm$

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LEARNING

Arcs and Sectors - Answers

| 3) | A semi circle has a perimeter of $80cm$. Given that $d = 2r$, calculate the diameter of the semicircle to 1 decimal place. | $2r + \left(\frac{180}{360} \times \pi \times 2r\right) = 80$

 $2r + \pi r = 80$

 $r(\pi + 2) = 80$

 $r = \frac{80}{\pi+2} = 15.55938119...$

 $d = 21.11876237... = 21.1 \, cm \, (1dp)$ |

THIRD SPACE
LEARNING

Arcs and Sectors - Mark Scheme

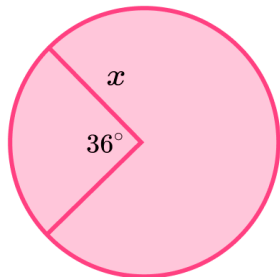|	Question	Answer	
	Exam Questions		
1)	The diagram shows an equilateral triangle ABC with sides of $6cm$. P is the midpoint of AB Q is the midpoint of AC APQ is a sector of a circle with centre A. Calculate the area of the shaded region to 3 significant figures.	60° **seen**	**(1)**
		Area of Triangle: $\frac{1}{2} \times 6 \times 6 \times \sin(60)$	**(1)**
		$9\sqrt{3}$ **oe**	**(1)**
		Area of Sector: $\frac{60}{360} \times \pi \times 3^2$	**(1)**
		$\frac{3}{2}\pi$ **oe**	**(1)**
		$9\sqrt{3} - \frac{3}{2}\pi = 10.87606829...$	**(1)**
		$10.9 \ cm^2 \ (3sf)$	**(1)**
2)	The sector of a circle with centre O has a radius of $80cm$. The two points A and B are connected by an arc and a chord. As angle $AOB = 35^o$, calculate the area of the shaded region to 3 significant figures.	Area of a Sector $\left(\frac{\theta}{360} \times \pi r^2 \right)$ $\frac{35}{360} \times \pi \times 80^2$	**(1)**
		$= 1954.7687...$	**(1)**
		Area of a Triangle $\left(\frac{1}{2}ab\sin(C) \right)$ $\frac{1}{2} \times 80 \times 80 \times \sin(35)$	**(1)**
		$= 1835.4446...$	**(1)**
		$1954.76... - 1835.44... = 119.3241659...$	**(1)**
		$= 119.3 \ cm^2 \ (3sf)$	**(1)**

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Arcs and Sectors - Mark Scheme

| 3) | The major arc length of the circle below is $31.1 cm$.

Find the length of x, the radius of the circle. Give your answer to 1 decimal place. | 324 **seen**

$\frac{324}{360} \times 2 \times \pi \times x = 31.1$ **oe**

$x = 5.499687478...$

$x = 5.5\ cm\ (1dp)$ | **(1)**

(1)

(1)

(1) |

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