Write your name, centre number and candidate number in the boxes below.

Surname	Other names

Centre number | | | | | |

Candidate number | | | | |

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Arc length and sector area

Time allowed: 45 minutes

Subject code **0580**

Mathematics

Questions from Paper 1 and Paper 2

You must have: a ruler marked in centimetres and millimetres, a protractor, compasses, a pen, an HB pencil and an eraser.
You may use a calculator.

Total marks

/ 37

Instructions

- Answer every question in the space provided on this paper.
- Write in black or dark blue ink. Pencil may be used for diagrams and graphs.
- Fill in your name, centre number and candidate number above.
- Show your working: a correct method can earn marks even if the answer is wrong.
- Unless a question says otherwise, give answers that are not exact to 3 significant figures, and angles in degrees to 1 decimal place.

Information

- This paper has 10 questions worth 37 marks in total.
- The marks for each question or part are shown in brackets, for example [3].

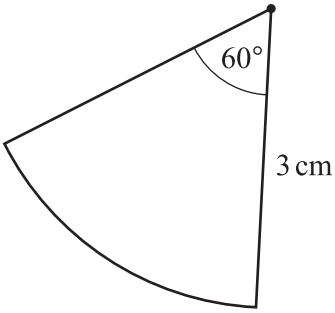
Advice

- Read every question through once before you write anything.
- Use the marks in brackets to judge how long to spend on each part.
- If you finish early, go back and check your working.

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Print at 100% (Actual size) so diagrams keep their real measurements.

1



NOT TO SCALE

The diagram shows a sector of a circle with radius 3 cm and sector angle 60°.

Calculate the area of the sector.
Give your answer in terms of π in its simplest form.

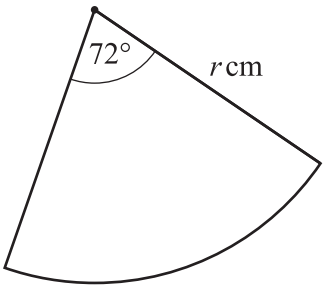
..... cm^2 [2]

Arc length and sector area Click for more variations

1	$\frac{3}{2}\pi$, $1\frac{1}{2}\pi$, or 1.5π	**2**	**M1** for $\frac{60}{360}\times\pi\times3^2$ oe

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2



NOT TO SCALE

The diagram shows a sector of a circle with radius r cm and sector angle 72°.
The arc length is 9.35 cm.

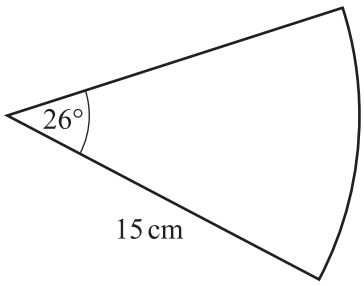
Calculate the value of r.

$r =$ ..... [2]

Arc length and sector area Click for more variations

2	7.44 or 7.439 to 7.440…	**2**	**M1** for $2 \times \pi \times r \times \frac{72}{360} = 9.35$ oe or better

3



NOT TO SCALE

The diagram shows a sector of a circle with radius 15 cm.

Calculate the perimeter of this sector.

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Answer ..... cm [3]

Arc length and sector area Click for more variations

3	36.8 or 36.80 to 36.81	**3**	**M1** for $\frac{26}{360} \times 2 \times \pi \times 15$ **M1** for 2×15 + a term involving π

4 The perimeter of a sector of a circle with radius 8 cm is 26 cm.

Calculate the angle of this sector.

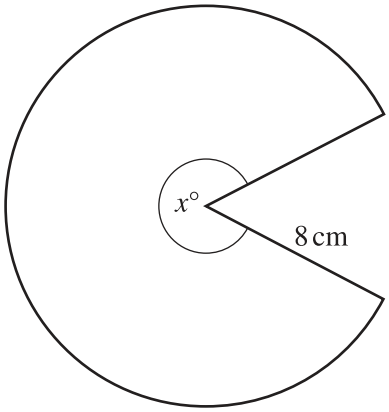
..... [3]

Arc length and sector area Click for more variations

4	71.6 or 71.61 to 71.62	**3**	**M2** for $\frac{\text{angle}}{360} = \frac{26-8-8}{2\pi \times 8}$ or better or **M1** for $\frac{\text{angle}}{360} \times 2\pi \times 8$ oe

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5



NOT TO SCALE

The diagram shows a sector of a circle of radius 8 cm.
The angle of the sector is $x°$.
The perimeter of the sector is $(16 + 14\pi)$ cm.

Find the value of x.

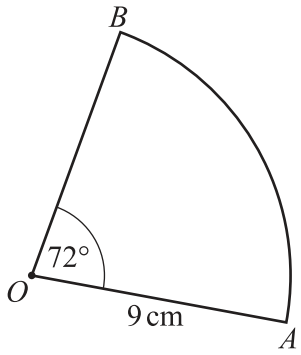
Answer $x =$ ..... [3]

Arc length and sector area Click for more variations

5	315	3	**M1** $\frac{x}{360} \times 2 \times \pi \times 8$ oe **M1** $\frac{x}{360} \times 2 \times \pi \times 8$ (+ 16) = (16 +) 14π

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6



NOT TO SCALE

The diagram shows a sector of a circle, centre O, radius 9 cm.
The sector angle is 72°.

(a) Calculate the length of the arc AB.

..... cm [2]

(b) Calculate the area of the sector AOB.

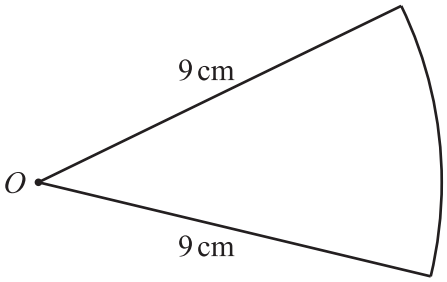
..... cm^2 [2]

(a) Arc length and sector area (b) Arc length and sector area Click for more variations

6(a)	11.3 or 11.305 to 11.312	**2**	**M1** for $\frac{72}{360}\times 2\times 9\times \pi$
6(b)	50.9 or 50.89 to 50.91	**2**	**M1** for $\frac{72}{360}\times 9^2\times \pi$

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7 The diagram shows a sector of a circle with centre O and radius 9 cm.



NOT TO SCALE

The perimeter of the sector is $(18+2\pi)$ cm.

Find the area of the sector.
Give your answer in terms of π.

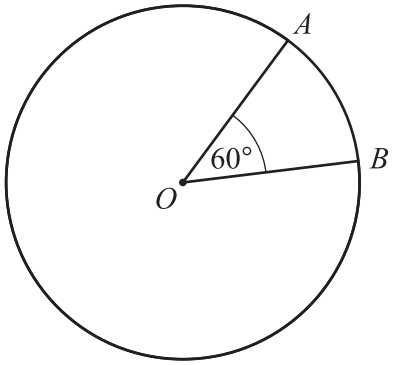
..... cm^2 [4]

Arc length and sector area Click for more variations

7	9π	**4**	**M3** for a fully correct method e.g. $\frac{2\pi}{2\pi\times 9}\times\pi\times 9^2$ oe OR **B2** for 40 or $\frac{1}{9}$ oe or **M1** for $18 + k\times 2\times\pi\times 9 = 18+2\pi$ oe **M1** for $(their\ k)\times\pi\times 9^2$ oe OR **SC2** for answer $81 + 9\pi$ oe

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8



NOT TO SCALE

The diagram shows a circle, centre O, radius 12 cm.

(a) Work out the area of the **minor** sector AOB.
Give your answer in terms of π in its simplest form.

..... cm^2 [2]

(b) Calculate the length of the **major** arc AB.
Give your answer in terms of π in its simplest form.

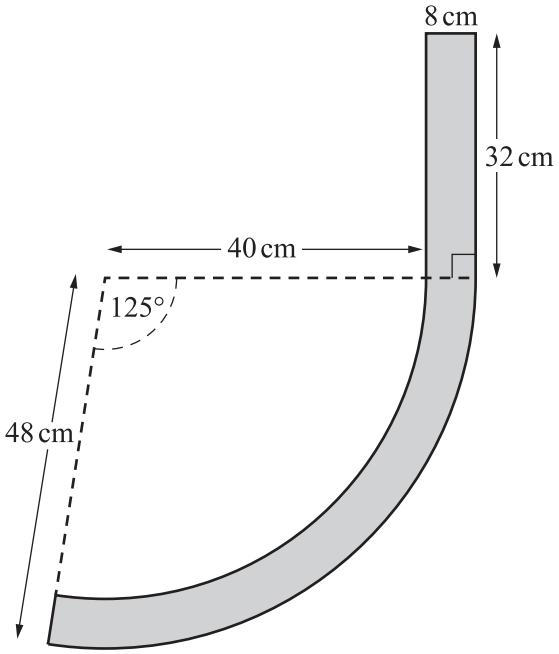
..... cm [3]

(a) Arc length and sector area (b) Arc length and sector area Click for more variations

8(a)	24π cao	**2**	**M1** for $\frac{60}{360}\times\pi\times12^2$ oe
8(b)	20π cao	**3**	**M2** for $\frac{360-60}{360}\times\pi\times12\times2$ oe or **M1** for $\frac{k}{360}\times\pi\times12\times2$ oe where $k < 360$

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9



NOT TO SCALE

The diagram shows the cross section of part of a park bench.
It is made from a rectangle of length 32 cm and width 8 cm and a curved section.
The curved section is made from two concentric arcs with sector angle 125°.
The inner arc has radius 40 cm and the outer arc has radius 48 cm.

Calculate the area of the cross section correct to the nearest square centimetre.

..... cm^2 [5]

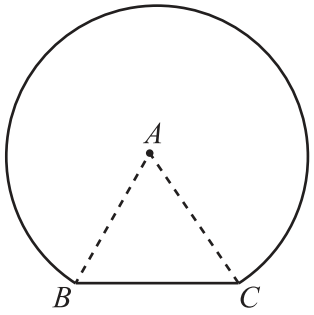
Arc length and sector area Click for more variations

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9	1024 cao	**5**	**B4** for 1023 to 1024.0… or 1020 or **M3** for $\frac{125}{360}\times\pi\times48^2-\frac{125}{360}\times\pi\times40^2+32\times8$ or **M1** for $\frac{125}{360}\times\pi\times48^2$ or $\frac{125}{360}\times\pi\times40^2$ **and M1** for $32\times8+k\pi$ If B0 scored **B1** for *their* more accurate decimal answer rounded correctly to an integer

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10 (a)



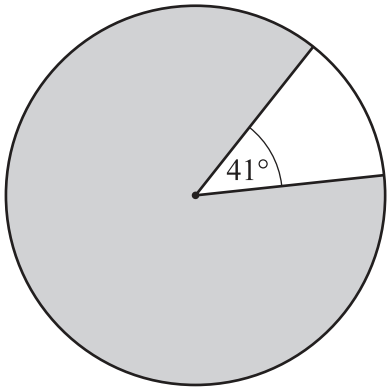
NOT TO SCALE

The diagram shows a shape made from an equilateral triangle ABC and a sector of a circle.
Points B and C lie on the circle, centre A.
The side length of the equilateral triangle is 12.4 cm.

Work out the perimeter of the shape.

..... cm [3]

(b)



NOT TO SCALE

The diagram shows two sectors of a circle.
The major sector is shaded.
The area of the major sector is 74.5 cm^2.

Calculate the radius of the circle.

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..... cm [3]

(a) Arc length and sector area (b) Arc length and sector area Click for more variations

10(a)	77.3 or 77.32 to 77.33…	**3**	**M2** for $\frac{360-60}{360}\times\pi\times12.4\times2$ oe $[\pm n\times12.4]$ or **M1** for angle 60° or 300° soi or for $\frac{k}{360}\times\pi\times12.4\times2$ oe $[\pm n\times12.4]$
10(b)	5.17 or 5.172 to 5.173…	**3**	**M2** for $\frac{74.5}{\pi}\times\frac{360}{360-41}=r^2$ oe or better or **M1** for $74.5=\frac{360-41}{360}\times\pi r^2$ oe or for $\sqrt{\frac{74.5}{\pi}\times\frac{360}{k}}$ oe

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