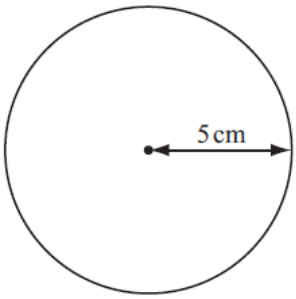
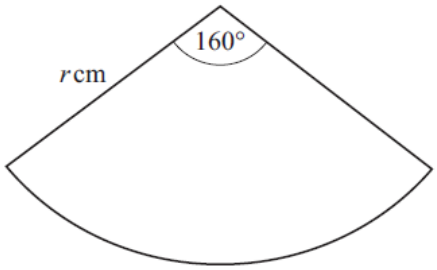
7.3 – Circumference, area of a circle, arc length and area of a sector

Student name: Answers Score: _____

1.



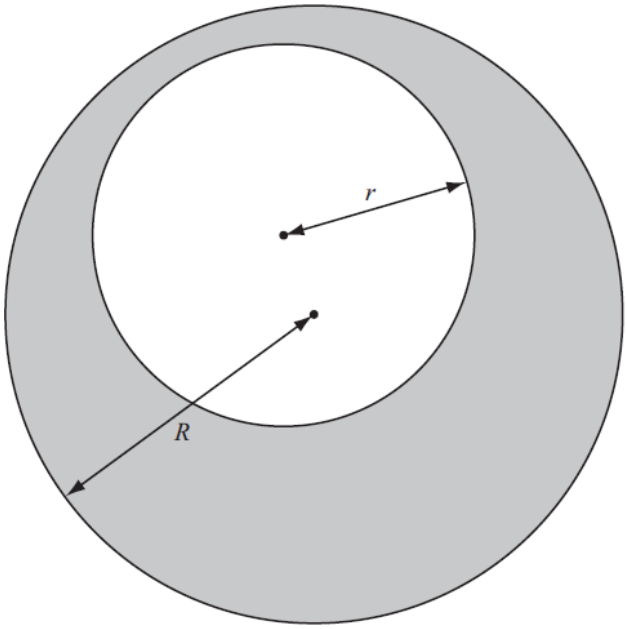


NOT TO SCALE

The diagrams show a circle with radius 5 cm and the sector of another circle with angle 160° and radius r cm.
The circle and the sector have the same area.
Calculate the value of r.

Answer $r =$ 7.5 [4]

2.



NOT TO SCALE

The diagram shows a circle of radius r inside a circle of radius R.

(a) Find an expression, in terms of π, r and R, for the shaded area.
Factorise your expression completely.

Answer(a) $\pi(R + r)(R - r)$ [2]

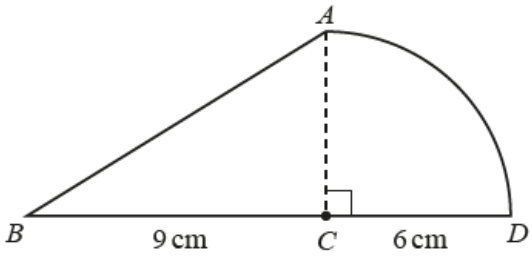
(b) When $R = r + 3$, the shaded area is 24π.

Answer(b) $r =$ 2.5 [2]

3. The area of a semicircle is $32\pi\,\text{cm}^2$.
Work out the perimeter of the semicircle.
Give your answer in terms of π.

$8\pi + 16$ cm [3]

4.



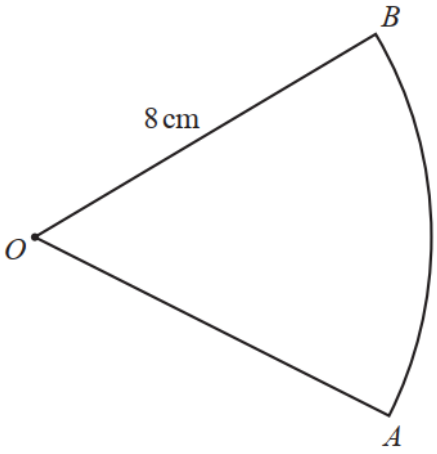
NOT TO SCALE

AD is an arc of a circle, centre C, and BCD is a straight line.
$BC = 9\,\text{cm}$, $CD = 6\,\text{cm}$ and angle $ACD = 90°$.

Find the total area of the shape $ABCD$.
Give your answer in terms of π.

$27 + 9\pi$ ..... cm^2 [3]

5.



NOT TO SCALE

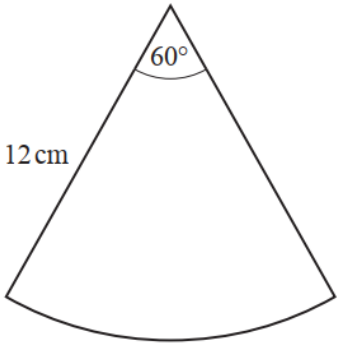
The length of the arc $AB = \frac{4\pi}{3}\,\text{cm}$.

The area of the sector OAB is $k\pi\,\text{cm}^2$.

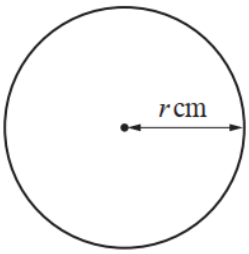
Find the value of k.

$k =$ $\frac{64}{12}$ ..... [3]

6.



NOT TO SCALE

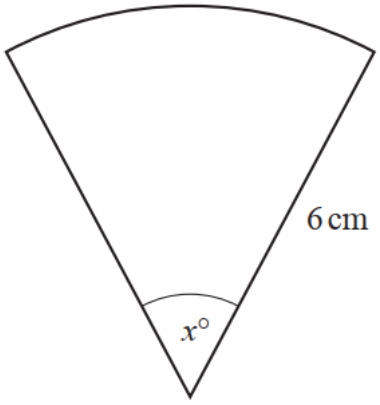


The sector and the circle have the same area.
The angle of the sector is 60°.
The radius of the sector is 12 cm and the radius of the circle is r cm.

Work out the value of r.
Give your answer as a surd in its simplest form.

$r =$ $2\sqrt{6}$ ..... [3]

7.



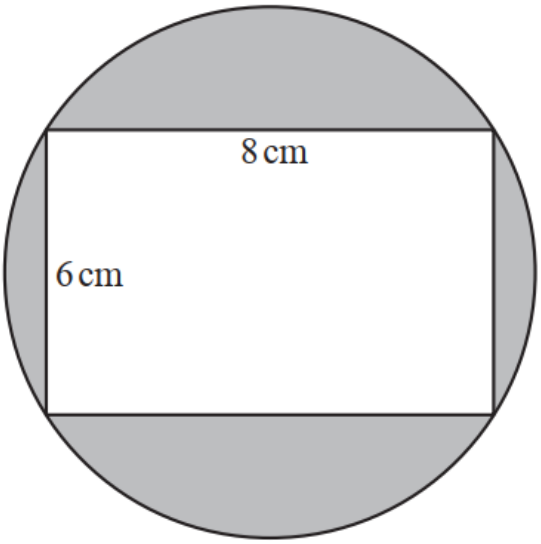
NOT TO SCALE

The area of this sector is $5\pi\,\text{cm}^2$.

Find the value of x.

$x =$ ..... 50° ..... [3]

8.



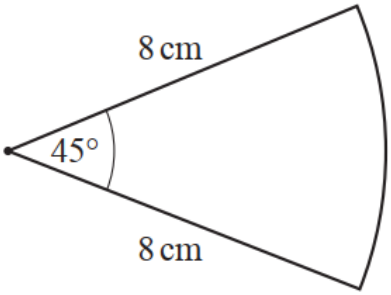
NOT TO SCALE

The four vertices of the rectangle each lie on the circle.

Find the shaded area.
Give your answer, in terms of π, in its simplest form.

..... $25\pi - 48$ ..... cm^2 [4]

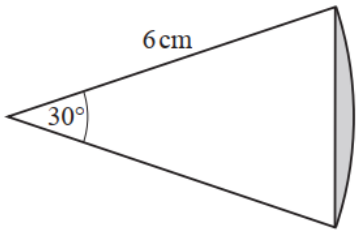
9. Find the area of the sector.
Give your answer, in terms of π, in its simplest form.



NOT TO SCALE

..... 8π ..... cm^2 [2]

10.



NOT TO SCALE

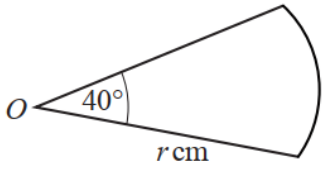
The diagram shows a sector of a circle with radius 6 cm and sector angle 30°.
The area of the shaded segment is $(a\pi - b)\text{cm}^2$.

Find the value of a and the value of b.

$a =$ 3

$b =$ 9 [3]

11.



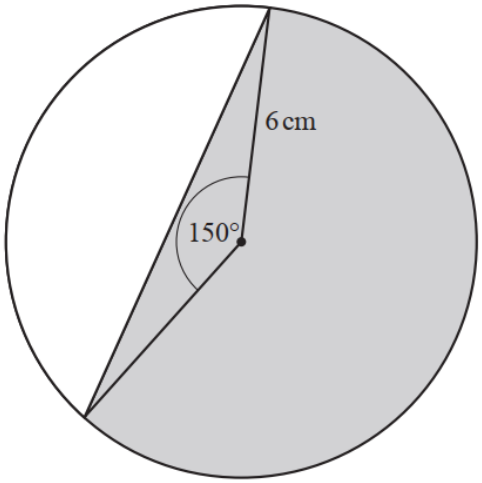
NOT TO SCALE

The diagram shows an arc of a circle, centre O, radius r cm.
The length of the arc is $k\pi r$ cm.

Find the value of k.
Give your answer as a fraction in its simplest form.

$k =$ $\frac{2}{9}$ [2]

12.



NOT TO SCALE

A sector of a circle with radius 6 cm has a sector angle of 150°.

Find the exact value of the area of the shaded region.
Give your answer in its simplest form.

$21\pi + 9$ cm^2 [4]