# 5.3) Areas of sectors and segments

## Worked example

A circle, centre O, radius 5.2 cm has a minor sector OAB where the arc AB subtends an angle of 0.4 radians at the centre of the circle.
Find the area of the sector.

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## Your turn

A circle, centre O, radius 5.2 cm has a minor sector OAB where the arc AB subtends an angle of 0.8 radians at the centre of the circle.
Find the area of the sector.

$10.816\ cm^2$

## Worked example

A circle, centre O, radius 5.2 cm has a minor sector OAB where the arc AB subtends an angle of 0.4 radians at the centre of the circle.
A segment is enclosed by a chord AB and the arc AB.
Find the area of the segment.

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## Your turn

A circle, centre O, radius 5.2 cm has a minor sector OAB where the arc AB subtends an angle of 0.8 radians at the centre of the circle.
A segment is enclosed by a chord AB and the arc AB.
Find the area of the segment.

$1.12\ cm^2$ (3 sf)

| Worked example | Your turn |
| --- | --- |
| The area of the minor sector $AOB$ is 14.45 cm². Given that $\angle AOB = 0.4$ radians and O is the centre of the circle, calculate the length of the radius | The area of the minor sector $AOB$ is 28.9 cm². Given that $\angle AOB = 0.8$ radians and O is the centre of the circle, calculate the length of the radius<br>$8.5\ cm$ |

| Worked example | Your turn |
| --- | --- |
| A sector of a circle of radius 110 m and perimeter 352 m.<br>Calculate the area of the sector | A sector of a circle of radius 110 m and perimeter 176 m.<br>Calculate the area of the sector<br><br>$1815\ m^2$ |

## Worked example

OAB is a sector of a circle, centre O, radius $8m$.
The chord $AB$ is 10m long.
Find the area of the segment.

## Your turn

OAB is a sector of a circle, centre O, radius $4m$.
The chord $AB$ is 5m long.
Find the area of the segment.

$3.00\ m^2$ (3 sf)

# Worked example

AB is the diameter of a semicircle, centre O, radius $r$ cm.
C is a point on the semicircle.
<BOC $= \theta$ radians.
Given that the area of ΔAOC is six times the segment enclosed by CB, show that $6\theta - 7\sin\theta = 0$

# Your turn

AB is the diameter of a semicircle, centre O, radius $r$ cm.
C is a point on the semicircle.
<BOC $= \theta$ radians.
Given that the area of ΔAOC is three times the segment enclosed by CB, show that $3\theta - 4\sin\theta = 0$

Shown

## Worked example

OAB is a sector of a circle, centre O, radius $18$ cm and angle $0.35$ radians.
C lies outside the sector.
AC is a straight line, perpendicular to OA.
OBC is a straight line.
Find the area of the region bounded by the arc AB and the lines AC and BC

## Your turn

OAB is a sector of a circle, centre O, radius $9$ cm and angle $0.7$ radians.
C lies outside the sector.
AC is a straight line, perpendicular to OA.
OBC is a straight line.
Find the area of the region bounded by the arc AB and the lines AC and BC

$5.76\ cm^2$ (3 sf)

## Worked example

OPQ is a sector of a circle, centre O, radius 20 cm where <POQ $= 0.6$ radians.
The point R is on OQ such that the ratio OR:RQ is $1:3$
A region is bounded by the arc PQ, QR and a line RP.

a) Find the perimeter of the region
b) Find the area of the region

## Your turn

OPQ is a sector of a circle, centre O, radius 10 cm where <POQ $= 0.3$ radians.
The point R is on OQ such that the ratio OR:RQ is $1:3$
A region is bounded by the arc PQ, QR and a line RP.

a) Find the perimeter of the region
b) Find the area of the region

a) $18.1\ cm$ (3 sf)
b) $11.3\ cm^2$ (3 sf)