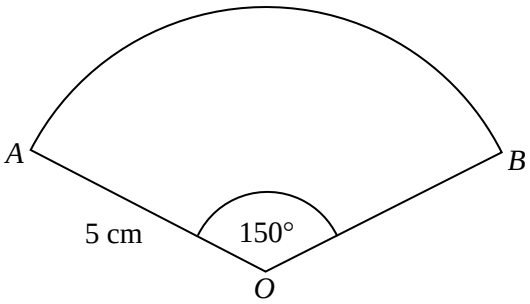
Sectors (Area and Arc Length)

SCAN ME

REVISE THIS TOPIC

1 *OAB* is a sector of a circle.



(a) Work out the area of the sector.
Give your answer to 1 decimal place.

$\frac{150}{360} \times \pi \times 5^2$

$= 32.72492347$

32.7 ..... cm^2

(2)

(b) Work out the length of the arc *AB*.
Give your answer to 1 decimal place.

$\frac{150}{360} \times \pi \times 10$

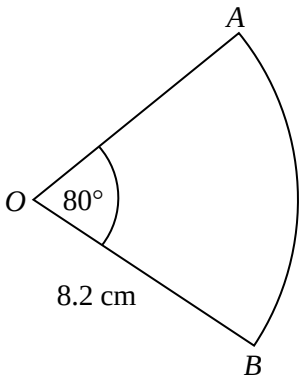
$= 13.08996939$

13.1 ..... cm

(2)

(Total for Question 1 is 4 marks)

2 *OAB* is a sector of a circle.



(a) Work out the area of the sector.
Give your answer to 1 decimal place.

$\frac{80}{360} \times \pi \times 8.2^2$

$= 46.94237556$

46.9 ..... cm^2

(2)

(b) Work out the length of the arc *AB*.
Give your answer to 1 decimal place.

$\frac{80}{360} \times \pi \times 16.4$

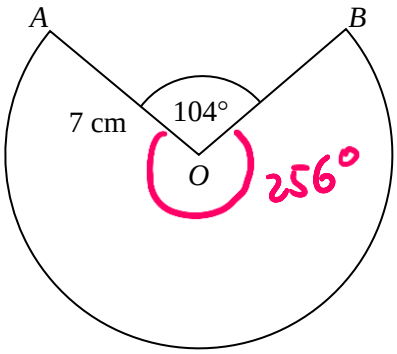
$= 11.44935989$

11.4 ..... cm

(2)

(Total for Question 2 is 4 marks)

3 *OAB* is a sector of a circle.



360 − 104
= 256°

(a) Work out the area of the sector.
Give your answer to 1 decimal place.

$\frac{256}{360} \times \pi \times 7^2$

$= 109.4670507$

109.5

..... cm^2

(2)

(b) Work out the length of the arc *AB*.
Give your answer to 1 decimal place.

$\frac{256}{360} \times \pi \times 14$

$= 31.2763002$

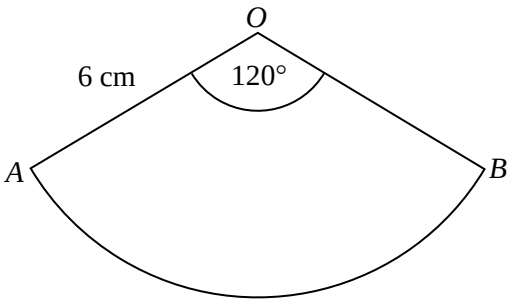
31.3

..... cm

(2)

(Total for Question 3 is 4 marks)

4 *OAB* is a sector of a circle.



(a) Work out the area of the sector.
Give your answer in terms of π

$\frac{120}{360} \times \pi \times 6^2$

$= \frac{1}{3} \times \pi \times 36$

12π ..... cm^2

(2)

(b) Work out the length of the arc *AB*.
Give your answer in terms of π

$\frac{120}{360} \times \pi \times 12$

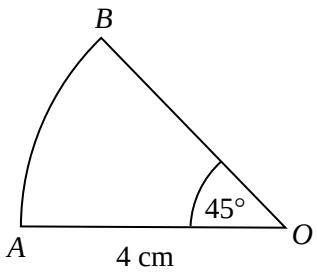
$= \frac{1}{3} \times \pi \times 12$

4π ..... cm

(2)

(Total for Question 4 is 4 marks)

5 *OAB* is a sector of a circle.



(a) Work out the area of the sector.
Give your answer in terms of π

$\frac{45}{360} \times \pi \times 4^2$

$= \frac{1}{8} \times \pi \times 16$

2π ..... cm^2

(2)

(b) Work out the length of the arc *AB*.
Give your answer in terms of π

$\frac{45}{360} \times \pi \times 8$

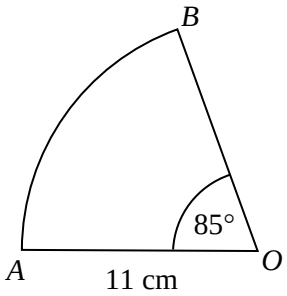
$= \frac{1}{8} \times \pi \times 8$

π ..... cm

(2)

(Total for Question 5 is 4 marks)

6 *OAB* is a sector of a circle.



Work out the **perimeter** of the sector.
Give your answer to 1 decimal place.

Arc length = $\frac{85}{360} \times \pi \times 22$

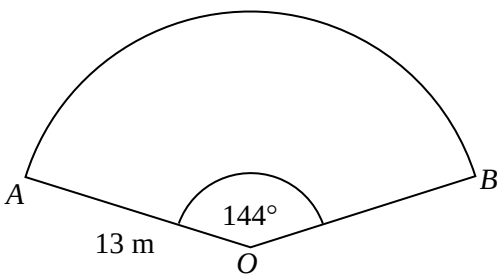
$= 16.318828 51$

$16.3... + 11 + 11 = 38.318828 51$

38.3 ..... cm

(Total for Question 6 is 3 marks)

7 *OAB* is a sector of a circle.



Work out the **perimeter** of the sector.
Give your answer to 1 decimal place.

Arc length = $\frac{144}{360} \times \pi \times 26$

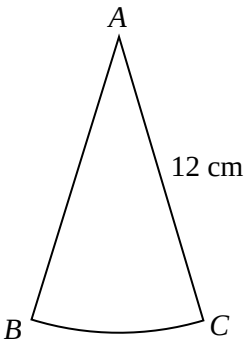
$= 32.67256 36$

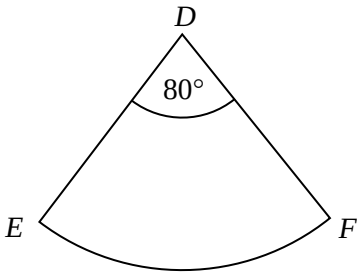
$32.6... + 13 + 13 = 58.67256 36$

58.7 ..... m

(Total for Question 7 is 3 marks)

8 *ABC and DEF* are sectors of different circles.





AC : *DF* = 3 : 2
Angle *BAC* : Angle *EDF* = 2 : 5

Tick the box for the sector with the greater area.

☐ Sector *ABC* ☑ Sector *DEF*

Show working to support your answer.

AC : DF
3 : 2
×4 ↓ ×4
12 : 8

BAC : EDF
2 : 5
×16 ↓ ×16
32 : 80

Area ABC = $\frac{32}{360} \times \pi \times 12^2$

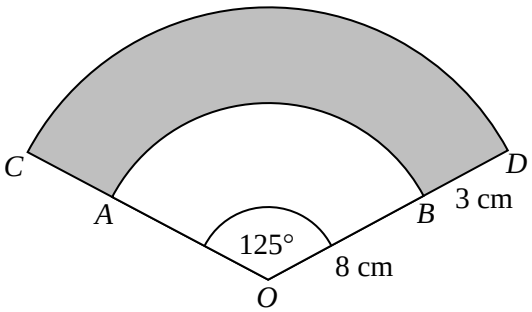
= 40.21238597

Area DEF = $\frac{80}{360} \times \pi \times 8^2$

= 44.68042885

(Total for Question 8 is 5 marks)

9 *OAB* and *OCD* are sectors of circles with centre *O*.



OB = 8 cm
BD = 3 cm

Work out the area of the shaded region.
Give your answer to 3 significant figures.

Area OCD $= \frac{125}{360} \times \pi \times 11^2$

$= 131.9905247$

Area OAB $= \frac{125}{360} \times \pi \times 8^2$

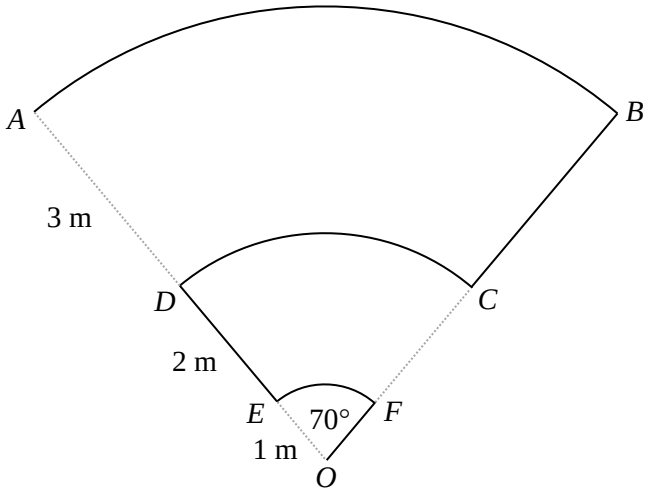
$= 69.81317008$

$131.99... - 69.81... = 62.17735462$

62.2 ..... cm^2

(Total for Question 9 is 4 marks)

10 *OAB*, *ODC* and *OEF* are sectors of circles with centre *O*.



OE = 1 m
ED = 2 m
DA = 3 m
Angle *AOB* = Angle *DOC* = Angle *EOF* = 70°

A robot starts at point *A* and follows the path *ABCDEFO*.

Work out the total distance that the robot travels.
Give your answer to 1 decimal place.

$AB = \frac{70}{360} \times \pi \times 12 = 7.330382858$

$CD = \frac{70}{360} \times \pi \times 6 = 3.665191429$

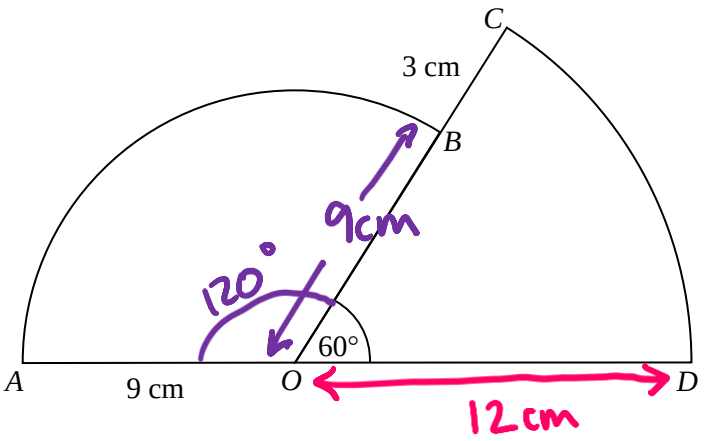
$EF = \frac{70}{360} \times \pi \times 2 = 1.221730476$

$7.33... + 3.66... + 1.22... + 3 + 2 + 1$
$= 18.217304 76$

18.2 m

(Total for Question 10 is 4 marks)

11 *OAB* and *OCD* are sectors of circles with centre *O*.



AO = 9 cm
BC = 3 cm
Angle *COD* = 60°

AOB and *OBC* are straight lines.

Area of sector *OAB* – Area of sector *OCD* = $k\pi$ where k is an integer.

Work out the value of k.

Area OAB $= \frac{120}{360} \times \pi \times 9^2$

$= \frac{1}{3} \times \pi \times 81$

$= 27\pi$

Area OCD $= \frac{60}{360} \times \pi \times 12^2$

$= \frac{1}{6} \times \pi \times 144$

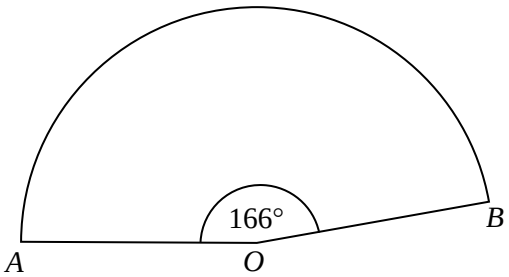
$= 24\pi$

$27\pi - 24\pi = 3\pi$

$k =$ 3

(Total for Question 11 is 4 marks)

12 *OAB* is a sector of a circle.



The area of the sector is 32 cm^2
Work out the radius of the sector.
Give your answer to 1 decimal place.

$\frac{166}{360} \times \pi \times r^2 = 32$

$r^2 = \frac{32 \times 360}{166\pi}$

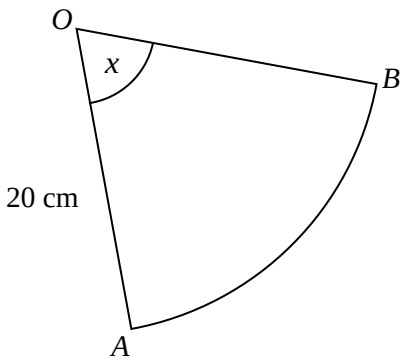
$r^2 = 22.089939\ldots$

$r = \sqrt{22.08\ldots}$

4.7 ..... cm

(Total for Question 12 is 3 marks)

13 *OAB* is a sector of a circle.



The length of arc *AB* is 22 cm
Work out the value of *x*.
Give your answer to the nearest degree.

$\frac{x}{360} \times \pi \times 40 = 22$

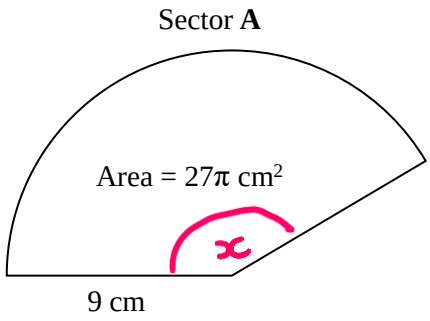
$x = \frac{22 \times 360}{40\pi}$

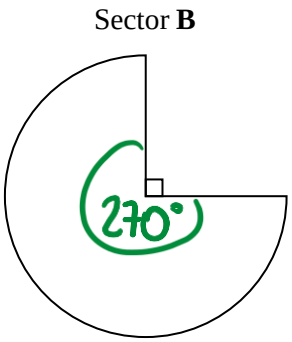
$x = 63.0253\ldots$

x = 63 °

(Total for Question 13 is 3 marks)

14 Here are two sectors from different circles.





The length of the arc of sector **B** = 2 × the length of the arc of sector **A**

Work out the area of sector **B**
Give your answer in terms of π

$\frac{x}{360} \times \pi \times 9^2 = 27\pi$

$\frac{81x\pi}{360} = 27\pi$

$\frac{9x}{40} = 27$

$x = \frac{27 \times 40}{9}$

$x = 120°$

$Arc_A = \frac{120}{360} \times \pi \times 18$

$= \frac{1}{3} \times \pi \times 18$

$= 6\pi$

$Arc_B = 12\pi$

$\frac{270}{360} \times \pi \times d = 12\pi$

$\frac{3}{4}\pi d = 12\pi$

$d = \frac{12 \times 4}{3}$

$d = 16$

$r = 8$

$\frac{270}{360} \times \pi \times 8^2$

$= \frac{3}{4} \times \pi \times 64$

$= 48\pi$

48π ..... cm^2

(Total for Question 14 is 6 marks)