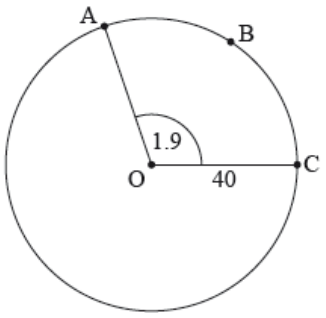
BECA / Huson / 12.1 IB Math SL Name:
3.1, 3.2, 3.3 Spiral Review Unit Circle Trig (Calculator, Paper 2)

3.1, 3.2, & 3.3 Unit Circle Trigonometry-mild (Calculator, Paper 2)

1a. The following diagram shows a circle with centre O and radius 40 cm.

diagram not to scale



The points A, B and C are on the circumference of the circle and $\mathrm{A\hat{O}C} = 1.9 \text{ radians}$.

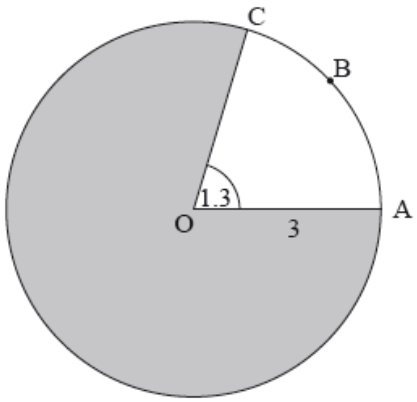
Find the length of arc ABC. *[2 marks]*

1b. Find the perimeter of sector OABC. *[2 marks]*

1c. Find the area of sector OABC. *[2 marks]*

2a. The following diagram shows a circle with centre O and radius 3 cm.

diagram not to scale



Points A, B, and C lie on the circle, and $\mathrm{A\hat{O}C} = 1.3 \text{ radians}$.

Find the length of arc ABC. *[2 marks]*

2b. Find the area of the shaded region. *[4 marks]*

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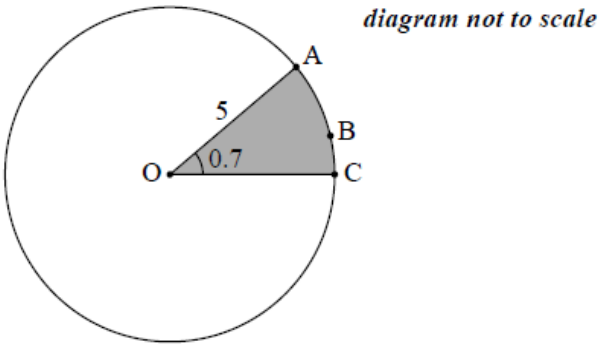
3.1, 3.2, 3.3 Spiral Review Unit Circle Trig (Calculator, Paper 2)

3a. The following diagram shows a circle with centre O and radius $5\ \mathrm{cm}$.



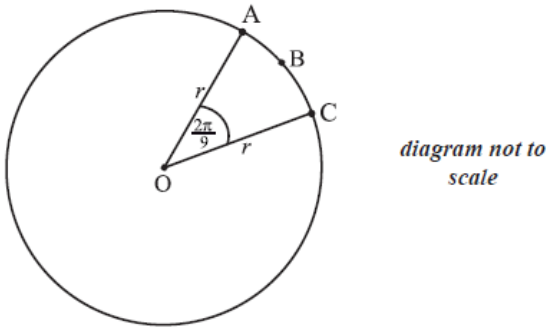
The points A, B, and C lie on the circumference of the circle, and $\mathrm{A\hat{O}C} = 0.7$ radians.

Find the length of the arc ABC. *[2 marks]*

3b. Find the perimeter of the shaded sector. *[2 marks]*

3c. Find the area of the shaded sector. *[2 marks]*

4a. The diagram below shows a circle centre O, with radius *r*. The length of arc ABC is $3\pi\ \mathrm{cm}$ and $\mathrm{A\hat{O}C} = \frac{2\pi}{9}$.



Find the value of *r*. *[2 marks]*

4b. Find the perimeter of sector OABC. *[2 marks]*

4c. Find the area of sector OABC. *[2 marks]*

5a. The circle shown has centre O and radius 3.9 cm.

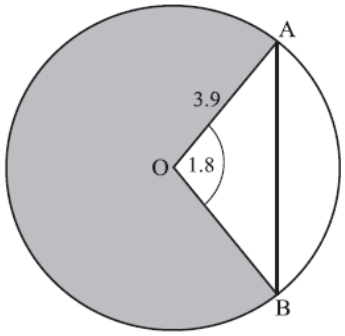


diagram not to scale

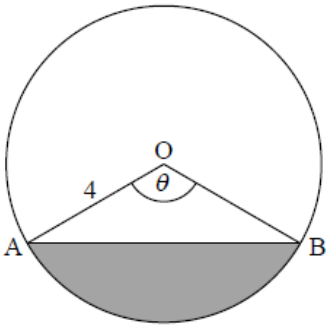
Points A and B lie on the circle and angle AOB is 1.8 radians.

Find AB. *[3 marks]*

5b. Find the area of the shaded region. *[4 marks]*

6a. The diagram shows a circle, centre O, with radius 4 cm. Points A and B lie on the circumference of the circle and $A\hat{O}B = \theta$, where $0 \leq \theta \leq \pi$.

diagram not to scale



Find the area of the shaded region, in terms of θ. *[3 marks]*

6b. The area of the shaded region is 12 cm^2. Find the value of θ. *[3 marks]*

7a. The following diagram shows a circle, centre O and radius r mm. The circle is divided into five equal sectors.

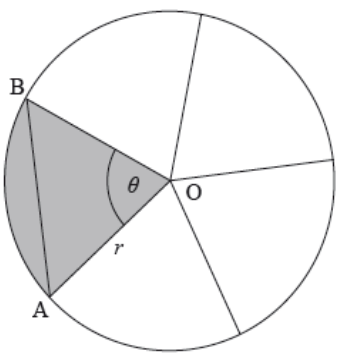


diagram not to scale

One sector is OAB, and $\mathrm{A\hat{O}B} = \theta$.

Write down the **exact** value of θ in radians. *[1 mark]*

7b. The area of sector AOB is $20\pi \text{ mm}^2$.

Find the value of r. *[3 marks]*

7c. Find AB. *[3 marks]*

8a. The following diagram shows a circle with centre O and radius 8 cm.

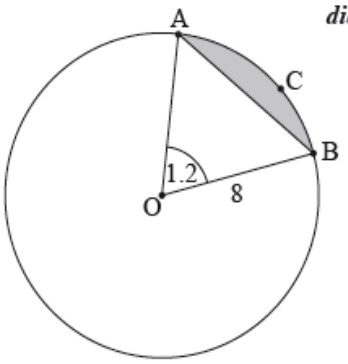


diagram not to scale

The points A, B and C are on the circumference of the circle, and $\mathrm{A\hat{O}B}$ radians.

Find the length of arc ACB. *[2 marks]*

8b. Find AB. *[3 marks]*

8c. Hence, find the perimeter of the shaded segment ABC. *[2 marks]*

9a. Consider the following circle with centre O and radius 6.8 cm.

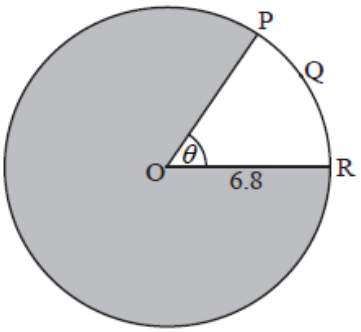


diagram not to scale

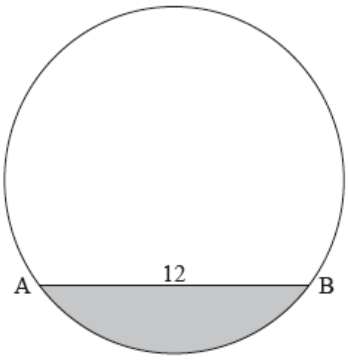
The length of the arc PQR is 8.5 cm.

Find the value of θ. *[2 marks]*

9b. Find the area of the shaded region. *[4 marks]*

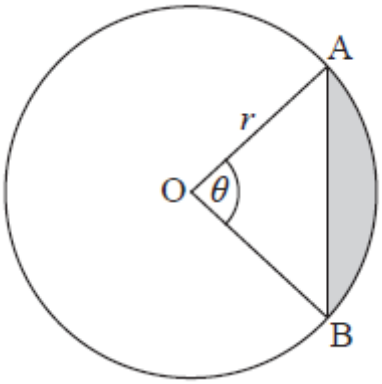
10. The following diagram shows the chord [AB] in a circle of radius 8 cm, where $\mathrm{AB} = 12\ \mathrm{cm}$.

diagram not to scale



Find the area of the shaded segment. *[7 marks]*

11a. A circle centre O and radius r is shown below. The chord [AB] divides the area of the circle into two parts. Angle AOB is θ.



Find an expression for the area of the shaded region. *[3 marks]*

11b. The chord [AB] divides the area of the circle in the ratio 1:7. Find the value of θ. *[5 marks]*

12a. The following diagram shows a circle with centre O and radius r cm.

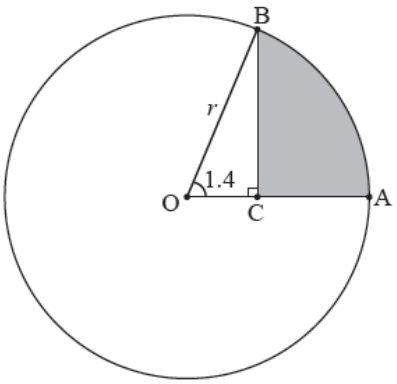


diagram not to scale

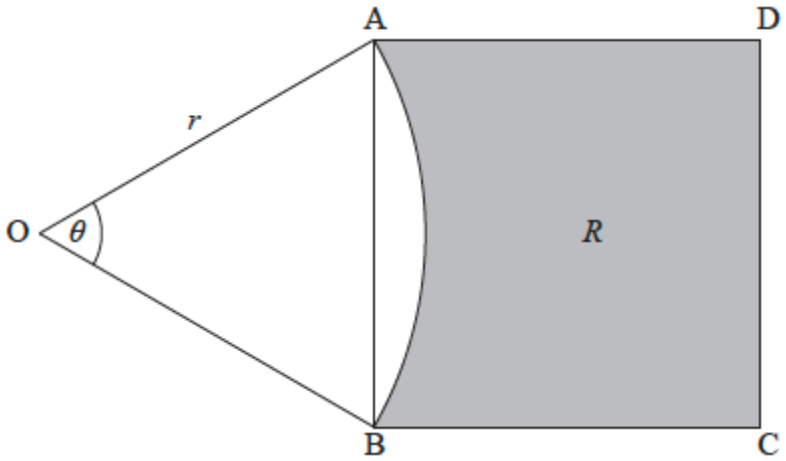
Points A and B are on the circumference of the circle and $\mathrm{A\hat{O}B} = 1.4$ radians.

The point C is on [OA] such that $\mathrm{B\hat{C}O} = \frac{\pi}{2}$ radians.

Show that $\mathrm{OC} = r\cos 1.4$. *[1 mark]*

12b. The area of the shaded region is 25 cm^2. Find the value of r. *[7 marks]*

13a. The following diagram shows a square $ABCD$, and a sector OAB of a circle centre O, radius r. Part of the square is shaded and labelled R.



$$\text{A}\hat{\text{O}}\text{B} = \theta, \text{ where } 0.5 \leq \theta < \pi.$$

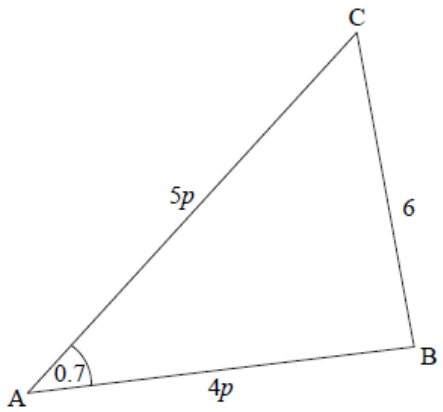
Show that the area of the square $ABCD$ is $2r^2(1 - \cos\theta)$. *[4 marks]*

13b. When $\theta = \alpha$, the area of the square $ABCD$ is equal to the area of the sector OAB.

(i) Write down the area of the sector when $\theta = \alpha$.

(ii) Hence find α. *[4 marks]*

14a. The following diagram shows a triangle ABC.

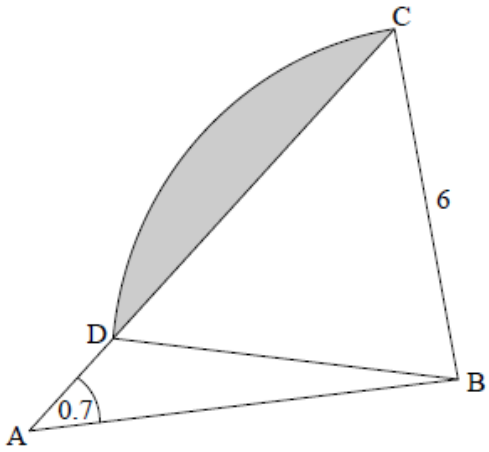


$\mathrm{BC} = 6$, $\mathrm{C\hat{A}B} = 0.7$ radians, $\mathrm{AB} = 4p$, $\mathrm{AC} = 5p$, where $p > 0$.

(i) Show that $p^2(41 - 40\cos 0.7) = 36$.

(ii) Find p. *[4 marks]*

14b. Consider the circle with centre B that passes through the point C. The circle cuts the line CA at D, and $\mathrm{A\hat{D}B}$ is obtuse. Part of the circle is shown in the following diagram.



Write down the length of BD. *[1 mark]*

14c. Find $\mathrm{A\hat{D}B}$. *[4 marks]*

14d. (i) Show that $\mathrm{C\hat{B}D} = 1.29$ radians, correct to 2 decimal places.

(ii) Hence, find the area of the shaded region. *[6 marks]*