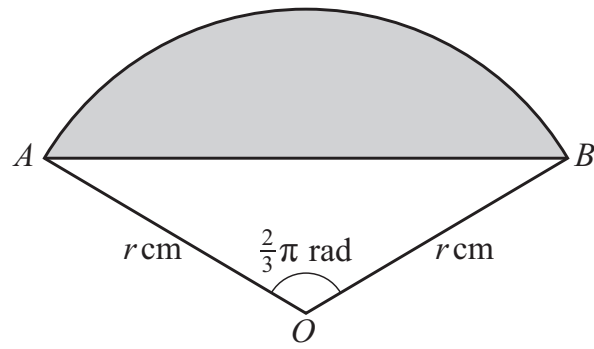


7



The diagram shows a sector of a circle with centre O and radius r cm. The shaded region is bounded by the chord AB and the arc AB . The size of angle AOB is $\frac{2}{3}\pi$ radians.

- (a)** Show that the area of the shaded region is approximately $0.614r^2 \text{ cm}^2$. [2]

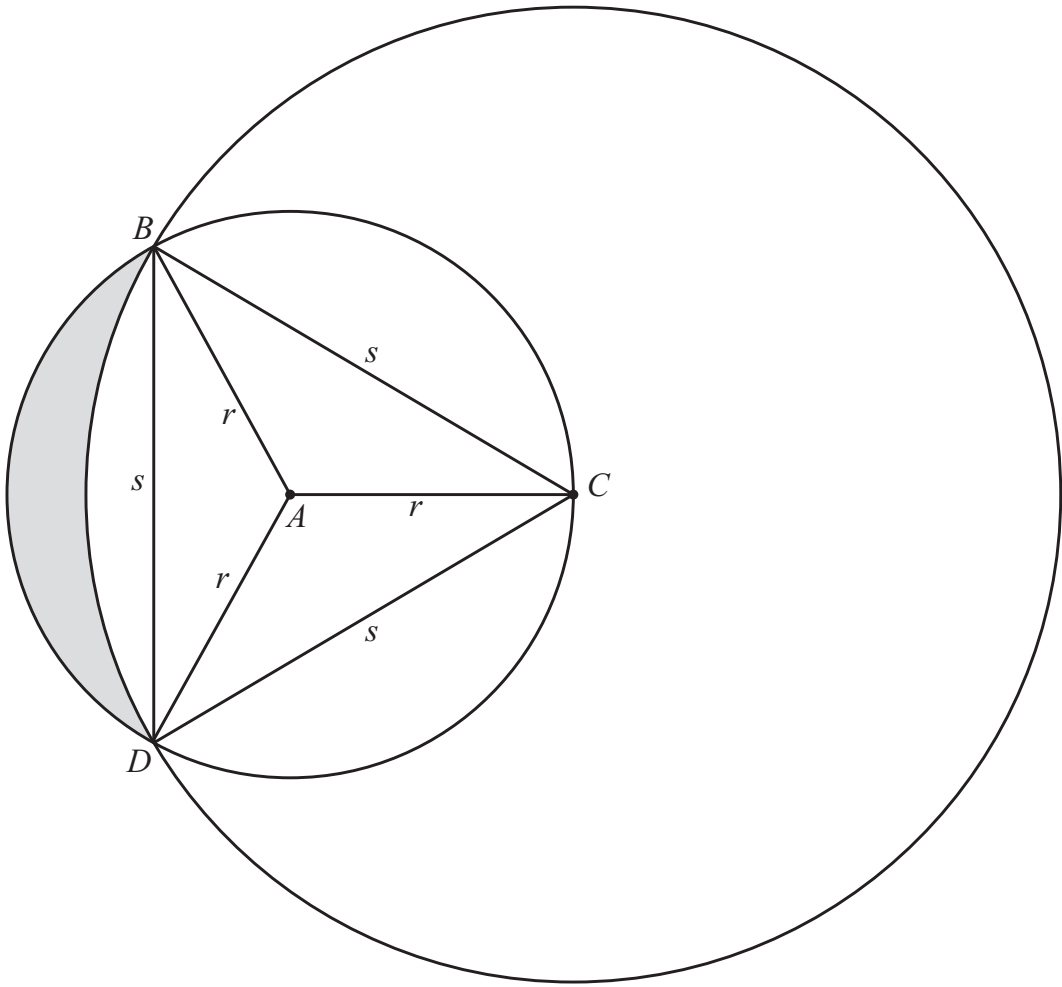
Blank lined paper for writing.

It is given that the radius of the circle is increasing at a rate of 0.4 cm s^{-1} .

- (b)

(i)
- Find the rate of increase of the area of the shaded region at the instant when $r = 20$.
Give your answer correct to 2 significant figures.
- [3]

- (ii)
- Find the rate of increase of the length of the arc AB . Give your answer correct to 2 significant figures.
- [3]



The diagram shows a circle with centre A and radius r passing through points B , C and D . A larger circle of radius s has centre C and passes through B and D . The length BD is also s .

(a) Show that $s = \sqrt{3}r$. [2]

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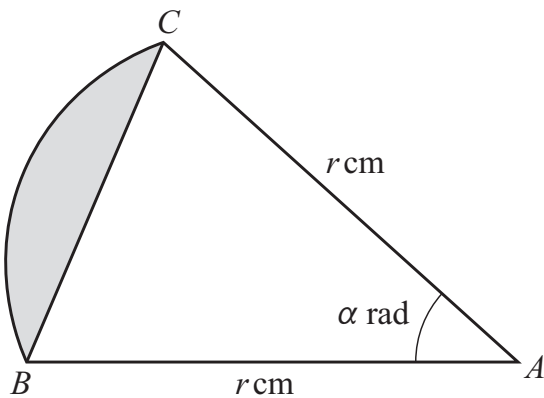
- (b)** Find an expression for the area of the shaded region. Give your answer in the form $(a + b\pi)r^2$, where a and b are constants to be found. [7]

Additional page

If you use the following page to complete the answer to any question, the question number must be clearly shown.

[illegible]

9



The diagram shows a sector ABC of a circle with centre A and radius r cm. The angle BAC is α radians, where $0 < \alpha < \frac{1}{2}\pi$.

- (a)** It is given that the area of the triangle ABC is 4 cm^2 and the area of the sector ABC is $8\alpha \text{ cm}^2$.

Find the exact area of the shaded segment.

[4]

[illegible]

(b) It is given instead that the length of the chord BC is $\frac{1}{\sqrt{2}}r$ cm but the area of the triangle ABC is still 4 cm^2 .

Find the area of the shaded segment. Give your answer correct to 3 significant figures. [4]

[illegible]