

Circular measure – 2022 O Level Additional Math

1. June/2022/Paper_11/No.9

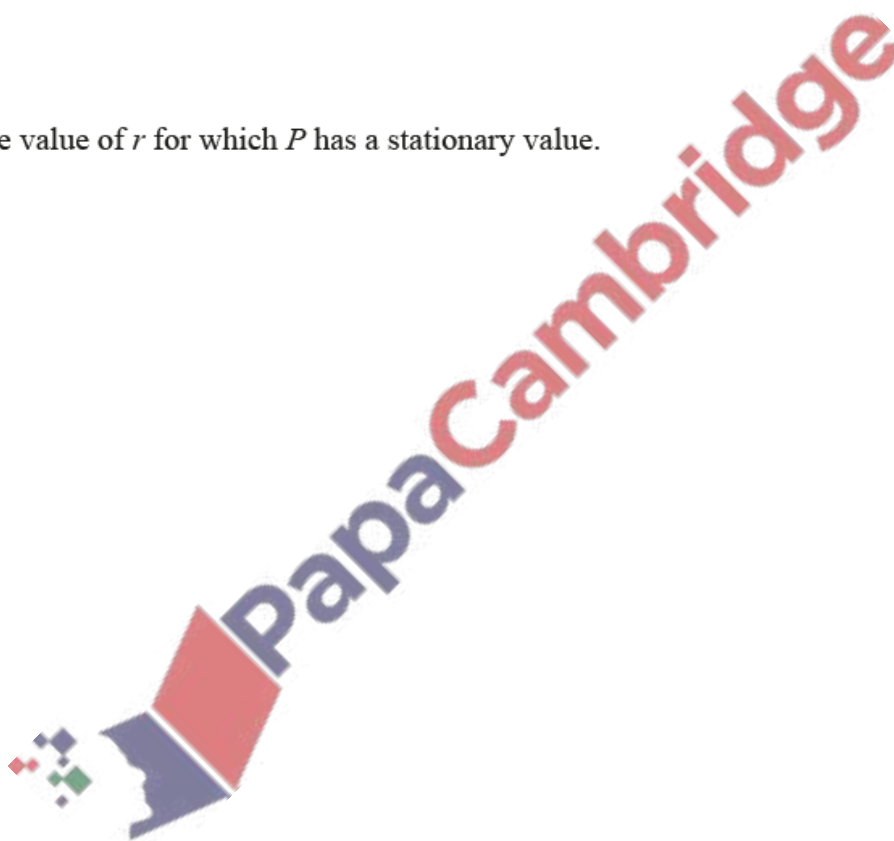
A circle, centre O and radius r cm, has a sector OAB of fixed area 10 cm^2 . Angle AOB is θ radians and the perimeter of the sector is P cm.

(a) Find an expression for P in terms of r .

[3]

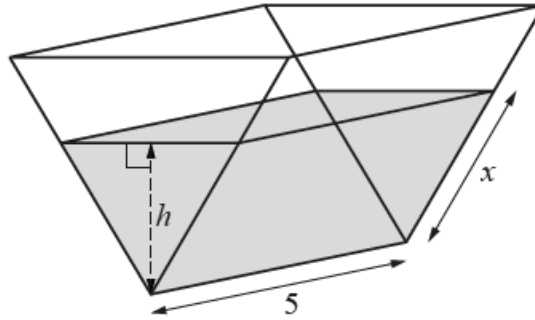
(b) Find the value of r for which P has a stationary value.

[3]



2. June/2022/Paper_21/No.9

In this question all lengths are in metres.



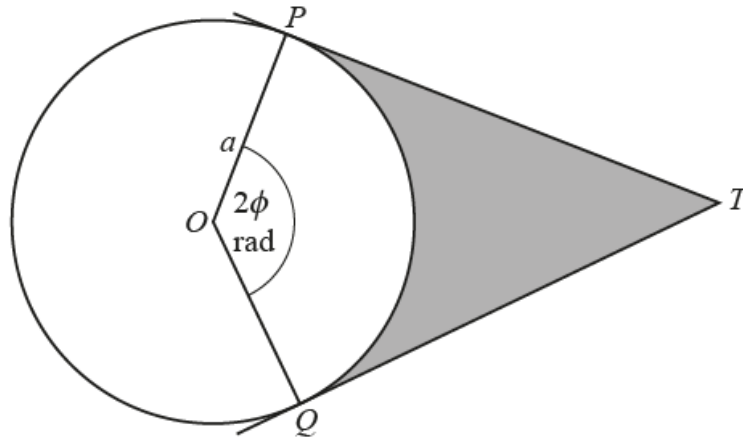
The diagram shows a water container in the shape of a triangular prism. The depth of water in the container is h . The container has length 5. The water in the container forms a prism with a uniform cross-section that is an equilateral triangle of side x .

- (a) Show that the volume, V , of the water is given by $V = \frac{5\sqrt{3}h^2}{3}$. [4]

- (b) Water is pumped into the container at a rate of 0.5 m^3 per minute. Find the rate at which the depth of the water is increasing when the depth of the water is 0.1 m. [4]

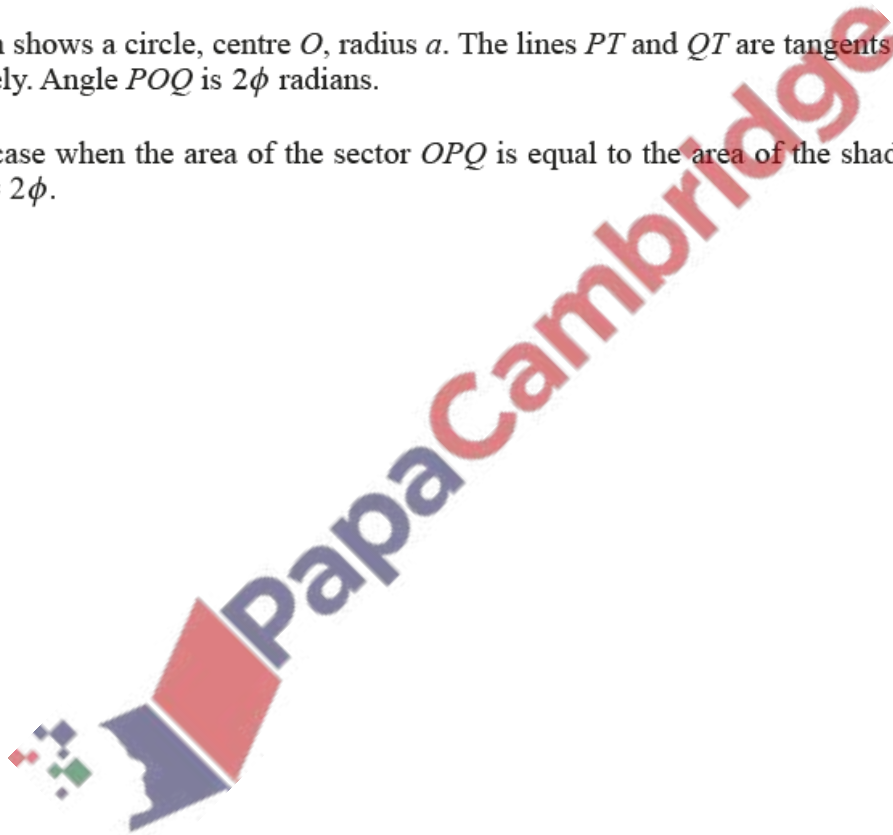
3. June/2022/Paper_22/No.9

In this question all lengths are in centimetres.



The diagram shows a circle, centre O , radius a . The lines PT and QT are tangents to the circle at P and Q respectively. Angle POQ is 2ϕ radians.

- (a) In the case when the area of the sector OPQ is equal to the area of the shaded region, show that $\tan \phi = 2\phi$. [4]



- (b) In the case when the perimeter of the sector OPQ is equal to half the perimeter of the shaded region, find an expression for $\tan \phi$ in terms of ϕ . [3]

