

# Circular Measure

## Question Paper

Level	Pre U
Subject	Maths
Exam Board	Cambridge International Examinations
Topic	Circular Measure
Booklet	Question Paper

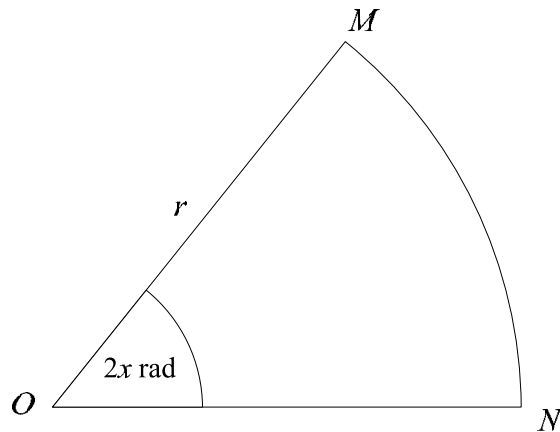
**Time Allowed:** 32 minutes

**Score:** /27

**Percentage:** /100

**Grade Boundaries:**

1



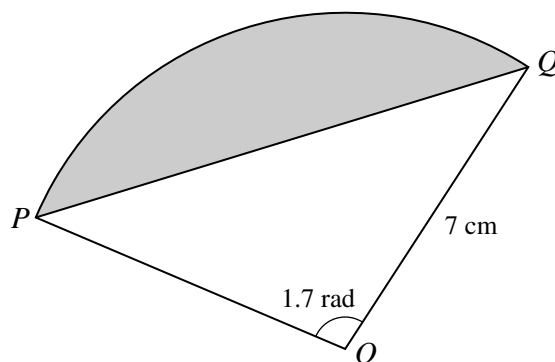
The diagram shows a sector of a circle,  $OMN$ . The angle  $MON$  is  $2x$  radians, the radius of the circle is  $r$  and  $O$  is the centre.

(i) Find expressions, in terms of  $r$  and  $x$ , for the area,  $A$ , and the perimeter,  $P$ , of the sector. [2]

(ii) Given that  $P = 20$ , show that  $A = \frac{100x}{(1+x)^2}$ . [2]

(iii) Find  $\frac{dA}{dx}$ , and hence find the value of  $x$  for which the area of the sector is a maximum. [5]

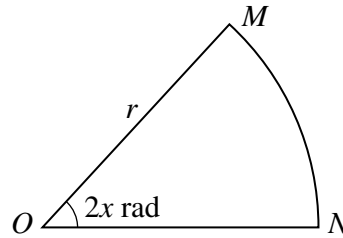
2 A sector,  $POQ$ , of a circle centre  $O$  has radius 7 cm and angle 1.7 radians (see diagram).



(i) Find the length of the line  $PQ$ . [3]

(ii) Hence find the perimeter of the shaded area. [2]

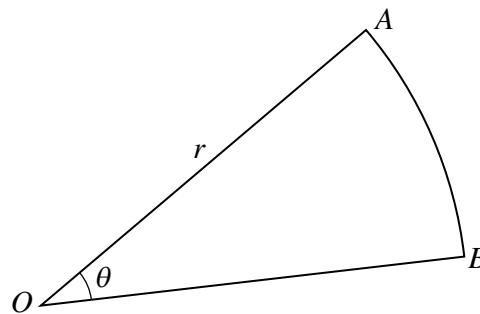
3



The diagram shows a sector of a circle,  $OMN$ . The angle  $MON$  is  $2x$  radians, the radius of the circle is  $r$  and  $O$  is the centre.

- (i) Find expressions, in terms of  $r$  and  $x$ , for the area,  $A$ , and perimeter,  $P$ , of the sector. [2]
- (ii) Given that  $P = 20$ , show that  $A = \frac{100x}{(1+x)^2}$ . [2]
- (iii) Find  $\frac{dA}{dx}$ , and hence find the value of  $x$  for which the area of the sector is a maximum. [5]

4



The diagram shows a sector  $OAB$  of a circle with centre  $O$  and radius  $r$  cm in which angle  $AOB$  is  $\theta$  radians. The sector has a perimeter of 18 cm.

- (i) Show that  $\theta = \frac{18 - 2r}{r}$ . [2]
- (ii) Find the area of the sector in terms of  $r$ , simplifying your answer. [2]