6

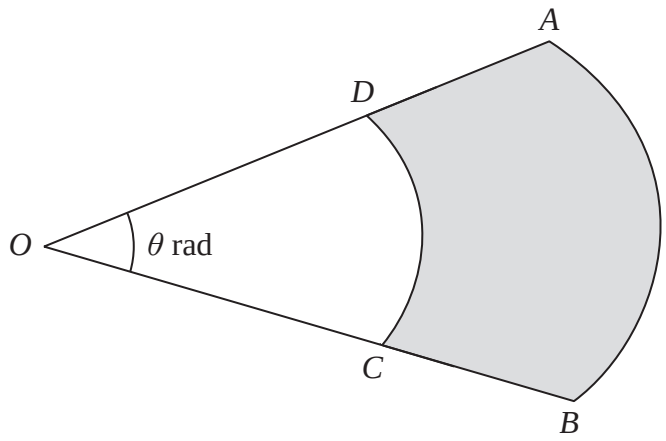

Diagram **NOT** accurately drawn

Figure 1

Figure 1 shows a sector OAB of the circle with centre O and radius 10 cm.

The points C and D lie on OB and OA respectively and CD is an arc of the circle with centre O and radius 6 cm. The size of angle AOB is θ radians. The shaded region is bounded by the arcs AB and CD and the lines AD and BC.

The area of the shaded region is S cm^2.

(a) Show that $S = 32\theta$.

(3)

The size of angle AOB is increasing at a constant rate of 0.2 rad/s.

(b) Find the rate of increase of S.

(2)

When the area of the shaded region is 20 cm^2

(c) calculate the perimeter of the shaded region.

(5)

Question 6 continued

Question 6 continued

Question 6 continued

(Total for Question 6 is 10 marks)