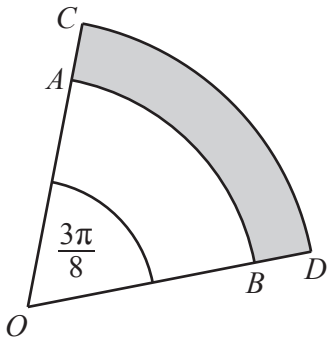
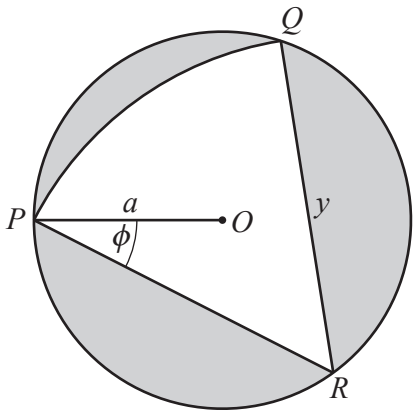
9 In this question, all lengths are in centimetres and all angles are in radians.

(a)



The diagram shows sectors AOB and COD of two circles with the same centre, O. Angle AOB is $\frac{3\pi}{8}$ and the length of OC is 6.5. It is given that OAC and OBD are straight lines and $OA : OC$ is 4 : 5. Find the perimeter of the shaded region. [3]

(b)



The diagram shows a circle with centre O and radius a. Sector PQR is a sector of a different circle with centre R and radius y. Angle OPR is ϕ. Find, in terms of a and ϕ only, the total area of the three shaded regions. Simplify your answer. [4]