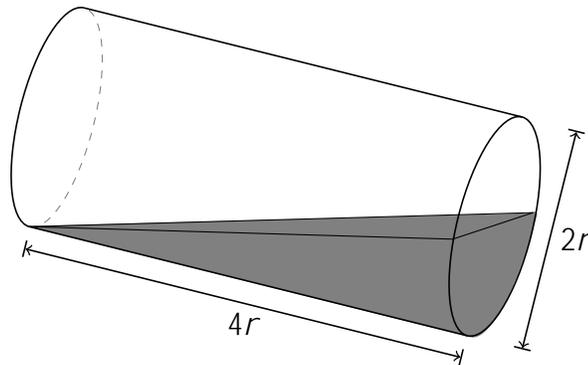


MATHEMATICS ENRICHMENT CLUB.
Problem Sheet 16, September 10, 2018

1. At a party of 11 people, everyone claims they shook hands with exactly 5 other people. Show that someone is lying.
2. The numbers on opposite faces of a standard 6 sided die always add up to 7. Suppose I have 27 standard dice arranged in a 3

Senior Questions

1. A regular polygon with n sides is inscribed in a circle. If A , B , C and D are four successive vertices of the polygon then the length of AD equals the side of the polygon plus the radius of the circle. Find all possible values of n .
2. A glass has the shape of a right circular cylinder with base of radius r and height twice the diameter of the base. The glass is tilted and partially filled with water so that the water touches the rim and covers half of the base, as shown in the diagram.



Calculate the volume of water in terms of r .