11. A sculpture is made up of 12 wooden cylinders, each of height 2cm. They are glued together as shown. The diameter of the top cylinder is 2cm and each of the other cylinders has a diameter 2cm more than the one immediately above it. The exhibit stands with its base on a marble table. What, in cm^2, is the total surface area of the sculpture, excluding the base?

A 456π B 356π C 256π D 156π E 144π
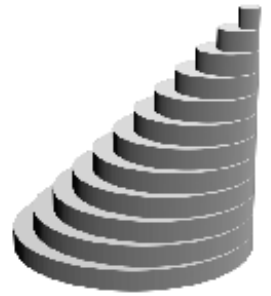
11.   A   The diameter of the largest cylinder is 24cm, so the sum of the areas of the horizontal parts of the sculpture, excluding its base, is that of a circle of diameter 24cm, that is 144π cm^2. The sum of the areas of the vertical parts of the sculpture is
$(2\pi \times 1 \times 2 + 2\pi \times 2 \times 2 + 2\pi \times 3 \times 2 + \ \ldots\ \ + 2\pi \times 12 \times 2)$ cm^2, that is 312π cm^2. So, excluding the base, the total surface area of the sculpture is 456π cm^2.