The 8 Circles Disc Worksheet

You have been assigned the task of designing a lightweight disc. The figure below is what you decided would be both lightweight and structurally sound for the task it’s intended for. The figure is composed of 1 large circle with 7 circles inside of it. Neighboring circles share only one point. The shaded area is the disc, and the un-shaded areas are the circles that will be cut out. The diameter of the disc is 30 cm.

Your job is to calculate: (show your work, use more paper when necessary)

1. The surface area of the disc after the smaller circles have been cut out
2. The surface area of the cut out sections
3. The circumference of the disc
4. The circumference of the innermost circle of the disc

Solution:

Since the diameter of the disc

is 30 cm, each circle has a

diameter of 10 cm.

1. The surface area of the disc after the smaller circles have been cut out

Area of a Circle=πr2

The area of the large circle is $π$ (15 cm)2 = 225$ π$ cm2

The area of each smaller circle is $π$ (5 cm)2 = 25$ π$ cm2

Since there are 7 smaller circles, the total area to be cut out is 7 x 25$ π$ cm2 = 175$ π$ cm2

You then subtract 175 $π$ cm2 from 225$ π$ cm2 and the answer is 50$ π$ cm2 (approx. 157 cm2)

1. The surface area of the cut out sections

As worked out above, 175$ π$ cm2 (approx. 549.5 cm2)

1. The circumference of the disc

Circumference =$ πd$

C = 30$ π$ cm

C = 94.2 cm (approx.)

1. The circumference of the innermost circle of the disc

C = 10 $π$ cm

C = 31.4 cm (approx.)