

SAK Tutor Base—Louise (Y11)

$\sin(60) = \frac{a}{H} = \frac{a}{R}$
 $a = R \sin(60)$
 $= \frac{R\sqrt{3}}{2}$
 $\frac{R\sqrt{3}}{2} \div 2 = \frac{R\sqrt{3}}{4}$
 \downarrow
 radius smaller circle.

$4(\pi r^2)$
 $4 \times \pi \times \left(\frac{R\sqrt{3}}{4}\right)^2 = \pi \left(\frac{R\sqrt{3}}{2}\right)^2$

$\frac{\text{smaller circles}}{\text{big circle}} = \frac{\pi \left(\frac{R\sqrt{3}}{2}\right)^2}{\pi R^2} = \frac{R^2 \cdot 3}{4 R^2} = \frac{3}{4}$

HAB Tutor Base—Rajveer (Y9)

$2r = \frac{\sqrt{3}}{2} R$
 $r = \frac{\sqrt{3}}{4} R$
 $\left(\frac{\sqrt{3}}{4}\right)^2 = \frac{3}{16} = r^2$
 $1 \text{ circle} = \frac{3}{16} \pi R$
 $4 \text{ circle} = \frac{12}{16} \pi R$
 $\frac{12}{16} = \frac{3}{4} = 75\% \text{ shaded}$

KC Tutor Base—Armaan (Y12)

$r = \frac{R}{2} \sin(60)$

total small circles: 4
 Area of Big circle: πR^2
 Total Area of small circles: $4 \pi r^2$
 $4 \pi \left(\frac{R}{2} \sin(60)\right)^2$
 $4 \pi \frac{R^2}{4} \sin^2(60)$
 shaded region:
 $\frac{4 \pi R^2 \sin^2(60)}{4}$
 $\frac{\pi R^2}{\pi R^2}$
 $= \frac{\sin^2(60)}{1}$
 $= \frac{3}{4}$

KRB Tutor Base—Sam (Y12)

Looking at the sector marked in RED PEN
 The sector side length is R - the radius of the larger circle
 The angle is 60° as it is 1 section of a hexagon.
 From the edge of the hexagon to the centre is 2r where "r" is the radius of a small circle
 This length can be worked out by using the trigonometry identity triangle. R is the hypotenuse, the adjacent side so:
 $\cos(60) = \frac{2r}{R}$
 $2r = R \cos(60)$
 $2r = R \cdot \frac{1}{2}$
 $r = \frac{R}{4}$
 e shaded area in the segment = $(\frac{1}{6} + \frac{1}{2}) \cdot (\text{Area of small circle})$
 e shaded area in the segment = $(\frac{2}{3}) \cdot (\pi r^2)$
 gment = $\frac{1}{6} \cdot \text{Area of large circle}$
 gment = $\frac{1}{6} \cdot \pi R^2$
 hat is shaded = Area of the shaded area in the segment / Area of segment
 hat is shaded = $\frac{[(\frac{2}{3}) \cdot (\pi r^2)]}{[\frac{1}{6} \cdot \pi R^2]}$
 hat is shaded = $\frac{[(\frac{2}{3}) \cdot \pi r^2]}{[\frac{1}{6} \cdot \pi R^2]}$
 hat is shaded = $4r^2 / R^2$
 hat is shaded = $4 \left[\frac{R(\sqrt{3}/4)\right]^2 / R^2$
 hat is shaded = $4 \left[3R^2 / 4\right] / R^2$
 hat is shaded = $[3R^2 / 4] / R^2$
 hat is shaded = $\frac{3}{4}$