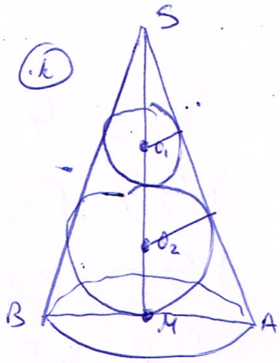
3.62
5

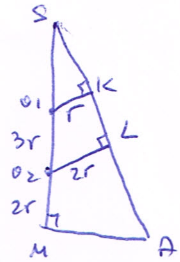
(א)



$8 \cdot \frac{4}{3}\pi r^3 = \frac{4}{3}\pi R^3$

$\boxed{2r = R}$

R - רדיוס הכדור הגדול
r - " " הקטן



$\triangle SO_2L$:

$\frac{O_1K}{O_2L} = \frac{SO_1}{SO_2}$

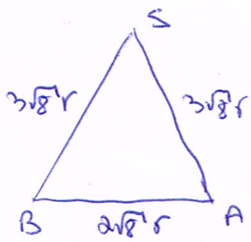
$\frac{r}{2r} = \frac{SO_1}{SO_1+3r}$

$\Rightarrow \boxed{SO_1 = 3r}$

$\triangle SMA$: $\frac{SK}{SM} = \frac{O_1K}{MA} = \frac{SO_1}{SA} \longrightarrow \frac{\sqrt{8}r}{8r} = \frac{r}{MA} = \frac{3r}{SA}$

$MA = \sqrt{8}r \qquad SA = 3\sqrt{8}r$

עבור חתך המכיל את גובה החרוט



משפט הקוסינוסים:

$BA^2 = SB^2 + AS^2 - 2SB\cdot SA\cdot \cos\angle S$

$4\cdot 8r^2 = 9\cdot 8r^2 + 9\cdot 8r^2 - 2\cdot 9\cdot 8r^2\cdot \cos\angle S$

$\cos\angle S = \frac{14}{18} = \frac{7}{9} \longrightarrow \sin\angle S = \frac{\sqrt{32}}{9}$

$AS^2 = SB^2 + AB^2 - 2\cdot AB\cdot SB\cdot \cos\angle A$

$\cos\angle A = \frac{AB^2}{2AB\cdot SB} = \frac{AB}{2SB} = \frac{2\sqrt{8}r}{2\cdot 3\cdot\sqrt{8}r} = \frac{1}{3}$

(ב)

$S_{מעטפת} = \pi \frac{1}{2}MA \cdot SA = \frac{1}{2}\pi \cdot 2\sqrt{8}r \cdot 3\sqrt{8}r = \frac{48\pi r^2}{2} = 24\pi r^2$

(MA – רדיוס החרוט; SA – הקו היוצר)

$V = \frac{1}{3}\cdot MS \cdot \pi MA^2 = \frac{1}{3}\cdot 8r\pi(\sqrt{8}r)^2 = \frac{64}{3}\pi r^3$

(MS – גובה החרוט; πMA^2 – שטח הבסיס)