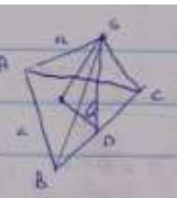
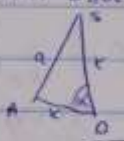
3.6/6 (א)



(3.33) $\triangle ABC \cong \triangle SBC$



$$\frac{a}{\sin\alpha} = \frac{x}{\sin(90-\frac{\alpha}{2})}$$

$$x = \frac{a\cos\frac{\alpha}{2}}{\sin\alpha} = \frac{a}{2\sin\frac{\alpha}{2}}$$

$$BD = \sqrt{AB^2 - AD^2} = \sqrt{a^2 - \frac{a^2}{4\sin^2\frac{\alpha}{2}}} = \frac{a}{2\sin\frac{\alpha}{2}}\sqrt{4\sin^2\frac{\alpha}{2}-1} \quad : \triangle ABD$$

$$BC = 2BD = \frac{a}{\sin\frac{\alpha}{2}}\sqrt{4\sin^2\frac{\alpha}{2}-1}$$

$$S_{ABC} = \frac{BC \cdot AD}{2} = \frac{\frac{a}{\sin\frac{\alpha}{2}}\sqrt{4\sin^2\frac{\alpha}{2}-1}\cdot\frac{a}{2\sin\frac{\alpha}{2}}}{2} = \frac{a^2}{4\sin^2\frac{\alpha}{2}}\sqrt{4\sin^2\frac{\alpha}{2}-1} = \frac{a^2}{2(1-\cos\alpha)}\sqrt{1-2\cos\alpha}$$

$$\sin^2\frac{\alpha}{2} = \frac{1-\cos\alpha}{2}$$

(ב) [illegible] $1-2\cos\alpha > 0$ [illegible]

$$\frac{1}{2} > \cos\alpha$$

$$60 < \alpha < 180$$

[illegible]

(ג) $\alpha = 90^\circ \rightarrow S_{ABC} = \frac{a^2}{2} \rightarrow V = \frac{1}{3} S_{ABC} \cdot \underset{SD}{\overset{}{AD}} = \frac{1}{3} \cdot \frac{a^2}{2} \cdot \frac{a}{2 \cdot \frac{\sqrt{2}}{2}} = \frac{a^3}{6\sqrt{2}}$