



$$V_{\text{учен}} = V_{\text{всех пирамид}} - V_{\text{маленькая}}$$

$$O_1A_1 = R_1 = \frac{2x}{\sqrt{2}} \quad C_1O_1 = \frac{2x}{\sqrt{2}} = \frac{2\sqrt{6}}{\sqrt{2}} = \frac{2\sqrt{6}}{\sqrt{2}}$$

$$OA = R_2 = \frac{3x}{\sqrt{2}} = \frac{3\sqrt{6}}{\sqrt{2}}$$

$$AK = \frac{3x}{\sqrt{2}} - \frac{2x}{\sqrt{2}} = \frac{x}{\sqrt{2}}$$

$\triangle AA_1K$  - прямоугольный.

$$\cos 60^\circ = \frac{AK}{AA_1} \Rightarrow$$

$$AK = \frac{3}{\sqrt{3}} = \frac{x}{\sqrt{2}}$$

$$x = \frac{3\sqrt{2}}{\sqrt{2}} = 3\sqrt{2}$$

$$x = \sqrt{6} \Rightarrow$$

$$CD = 3\sqrt{6}$$

$$C_1D_1 = 2\sqrt{6}$$

$$S_{\text{осн. } \delta} = CD^2$$

$$S_{\text{осн. } \mu} = C_1D_1^2$$

$\triangle APO \sim \triangle A_1PO_1$  (по двум углам)

$$\frac{O_1P}{OP} = \frac{R_1}{R_2} = \frac{2\sqrt{6}/\sqrt{2}}{\sqrt{2} \cdot 3\sqrt{6}} = \frac{2}{3}$$

$$OP = OO_1 + O_1P = 3 + O_1P$$

$$\frac{O_1P}{3 + O_1P} = \frac{2}{3} \Rightarrow 3O_1P = 6 + 2O_1P$$

$$O_1P = 6 \Rightarrow OP = 3 + 6 = 9 = h_{\mu}$$

$$V_{\text{всех пирамид}} = \frac{1}{3} S_{\text{осн. } \delta} \cdot h_{\mu} = \frac{1}{3} \cdot (3\sqrt{6})^2 \cdot 9 = 3 \cdot 54 = 162$$

$$V_{\mu} = \frac{1}{3} S_{\text{осн. } \mu} \cdot h_{\mu} = \frac{1}{3} \cdot (2\sqrt{6})^2 \cdot 9 = 48$$

$$V_{\text{учен}} = 162 - 48 = 114$$