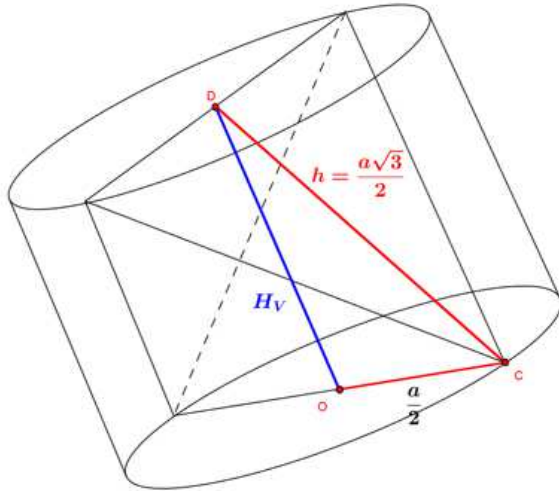


1. Oko pravilnog tetraedra opisan je valjak tako da su dve naspramne ivice tetraedra prečnici osnova valjka. Naći odnos zapremina tetraedra i valjka.



Potrebno je uočiti da je visina valjka H_V rastojanje između središta ivica tetraedra.

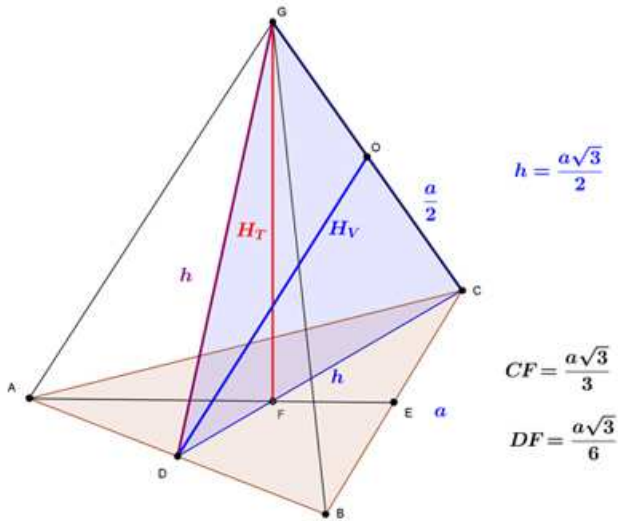
$$H_V^2 = \left(\frac{a\sqrt{3}}{2}\right)^2 - \left(\frac{a}{2}\right)^2$$

$$H_V^2 = \frac{3a^2}{4} - \frac{a^2}{4}$$

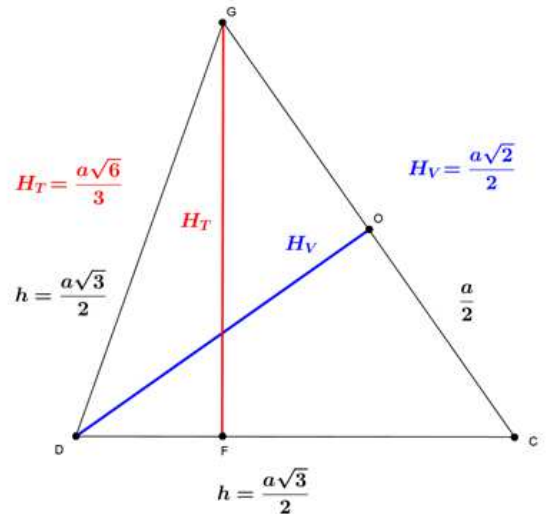
$$H_V^2 = \frac{2a^2}{4}$$

$$H_V = \frac{a\sqrt{2}}{2}$$

To je moguće uočiti i iz druge projekcije:



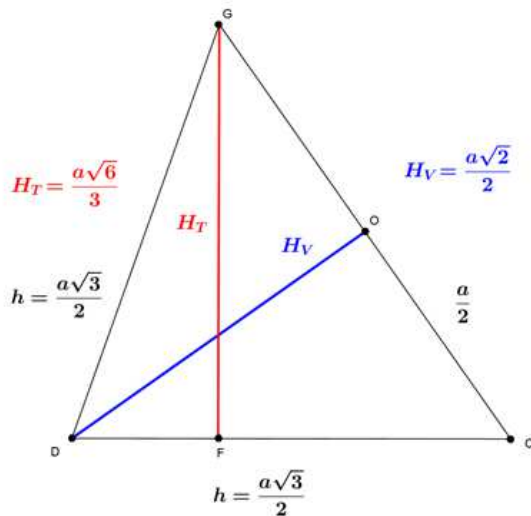
Kada je u pitanju visina tetraedra, najbolje je posmatrati ovu projekciju gde se uočavaju bitni elementi iz trougla DFG:



Na ovaj način izračunavamo visinu tetraedra:

$$H_T^2 = \left(\frac{a\sqrt{3}}{2}\right)^2 - \left(\frac{a\sqrt{3}}{6}\right)^2$$

$$H_T^2 = \frac{3a^2}{4} - \frac{3a^2}{36}$$



$$H_T^2 = \frac{27a^2}{36} - \frac{3a^2}{36}$$

$$H_T^2 = \frac{24a^2}{36}$$

$$H_T^2 = \frac{4a^2}{6}$$

$$H_T = \frac{2a}{\sqrt{6}}$$

$$H_T = \frac{a\sqrt{6}}{3}$$

Kada imamo sve elemente, lako je izračunati i odnos zapremine tetraedra i zapremine valjka:

$$\frac{V_{Tetraedra}}{V_{Valjka}} = \frac{B_T \cdot H_T}{B_V \cdot H_V}$$

$$\frac{V_T}{V_V} = \frac{B_T \cdot H_T}{3B_V \cdot H_V}$$

$$\frac{V_T}{V_V} = \frac{\frac{a^2\sqrt{3}}{4} \cdot \frac{a\sqrt{6}}{3}}{3 \cdot \left(\frac{a}{2}\right)^2 \pi \frac{a\sqrt{2}}{2}}$$

$$\frac{V_T}{V_V} = \frac{\frac{a^2\sqrt{3}}{4} \cdot \frac{a\sqrt{6}}{3}}{3 \cdot \frac{a^2}{4} \pi \frac{a\sqrt{2}}{2}}$$

$$\frac{V_T}{V_V} = \frac{\frac{\sqrt{2}}{4}}{\frac{3\sqrt{2}}{8}\pi} = \frac{8\sqrt{2}}{12\sqrt{2}\pi}$$

$$\frac{V_{Tetraedra}}{V_{Valjka}} = \frac{2}{3\pi}$$