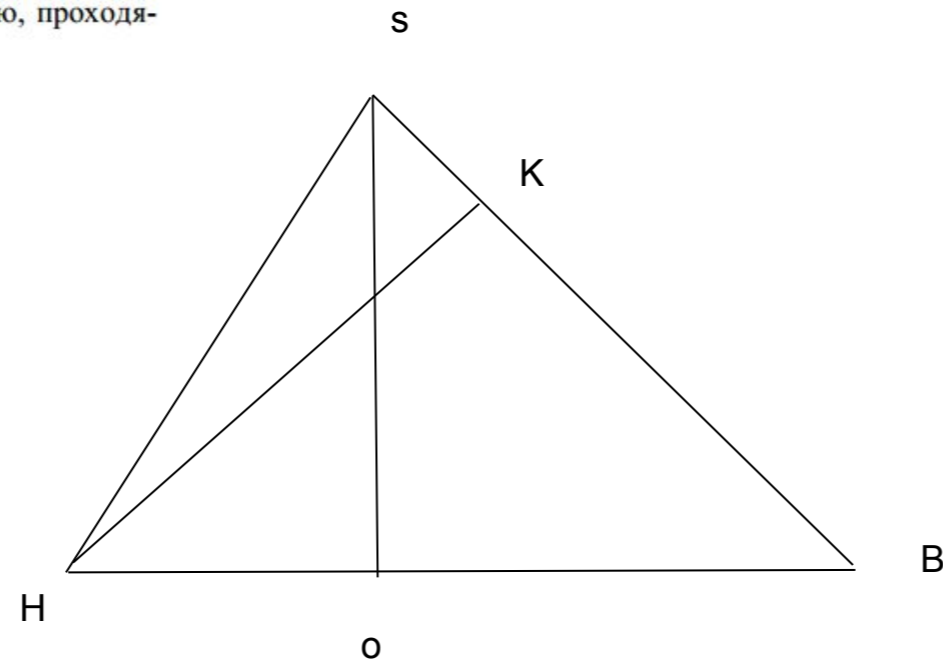
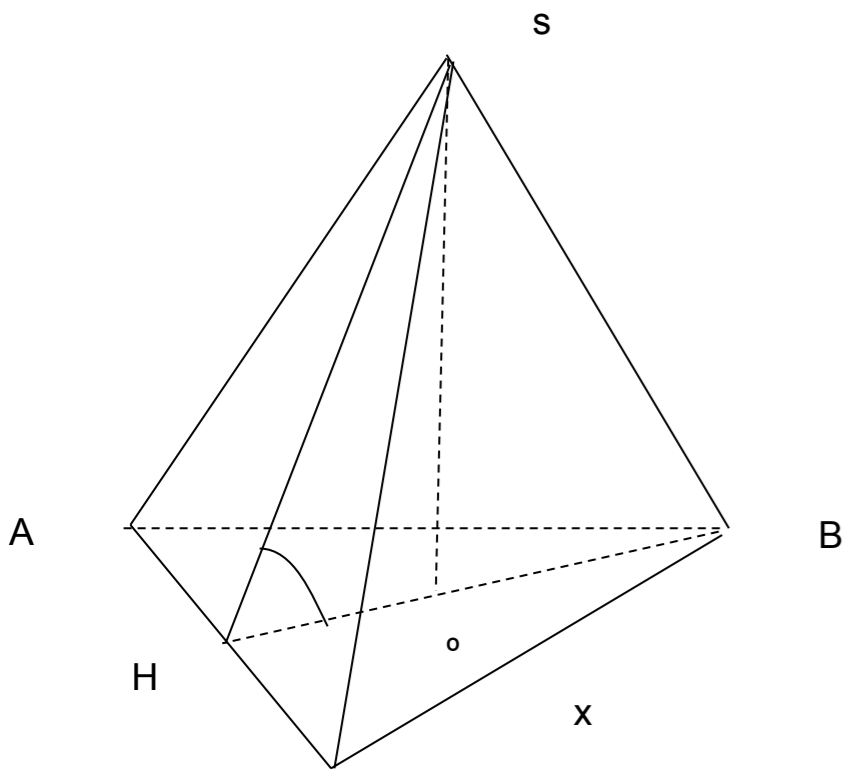


Косинус угла между боковой гранью и основанием ABC правильной треугольной пирамиды $SABC$ равен $\frac{\sqrt{3}}{4}$.

а) В каком отношении ребро SB делится перпендикулярной ему плоскостью, проходящей через точку A ?

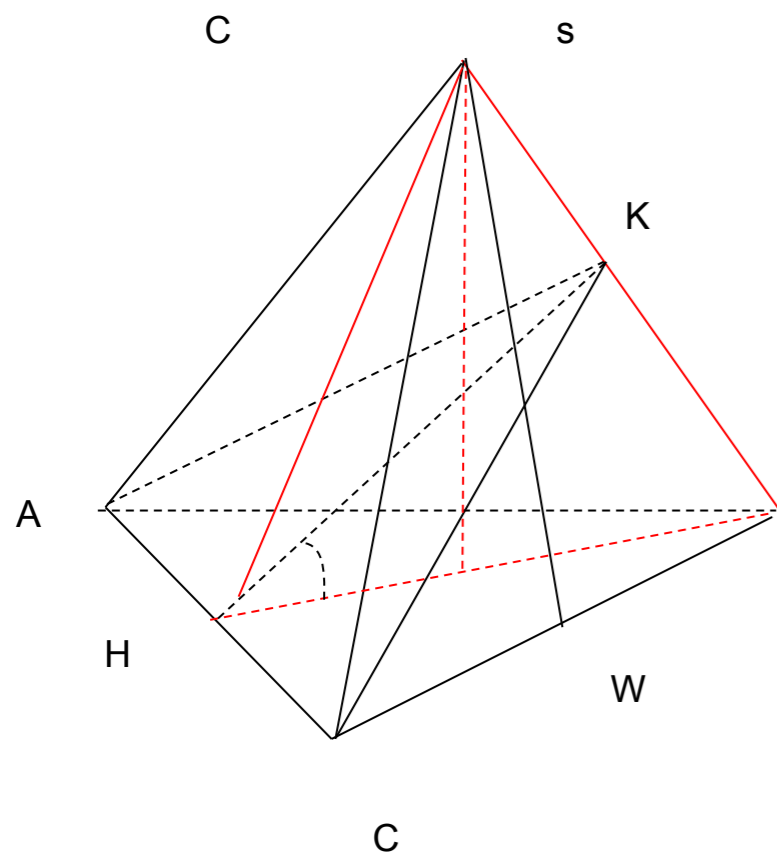
б) Найдите угол между боковыми гранями пирамиды.



$$\begin{aligned} \cos \angle SHB &= \sqrt{3}/4 \\ HO / SH &= \sqrt{3}/4 \\ CB &= x \\ 3HO &= \sqrt{(x^2 - (x/2)^2)} \\ HO &= \sqrt{(x^2 - (x/2)^2)} / 3 = \sqrt{(3x^2 / 4)} / 3 = (x\sqrt{3} / 2) / 3 = \\ &= x\sqrt{3} / 6 \\ (x\sqrt{3} / 6) / SH &= \sqrt{3}/4 \\ x\sqrt{3} / 6SH &= \sqrt{3} / 4 \\ 4x\sqrt{3} &= 6SH\sqrt{3} \\ SH &= 4x\sqrt{3} / 6\sqrt{3} = 4x / 6 = 2x / 3 \\ SO &= \sqrt{(SH^2 - HO^2)} = \sqrt{((4x^2 / 9) - (3x^2 / 36))} = x\sqrt{(4/9 - 1/12)} = \\ &= x\sqrt{((48 - 9) / 108)} = x\sqrt{(39 / 108)} = x\sqrt{(13/36)} = x * \sqrt{13} / 6 \\ BO &= 2HO = x\sqrt{3} / 3 \\ SB &= \sqrt{(SO^2 + BO^2)} = \sqrt{((x * \sqrt{13} / 6)^2 + (x\sqrt{3} / 3)^2)} = \\ &= x\sqrt{((13/36) + (3/9))} = x\sqrt{(25 / 36)} = 5x / 6 \end{aligned}$$

$$\begin{aligned} S(HSB) &= \frac{1}{2} HB * SO = \frac{1}{2} 3HO * SO = \frac{1}{2} (x\sqrt{3}/2) * x * \sqrt{13} / 6 = \\ &= x^2\sqrt{39} / 24 \\ S(HSB) &= \frac{1}{2} HK * SB. \quad HK = S / (\frac{1}{2} SB) = (x^2\sqrt{39} / 24) / (5x/12) = \\ &= (x^2\sqrt{39} * 12) / 120 = (x^2\sqrt{39}) / 10x = x\sqrt{39} / 10 \end{aligned}$$

$$\begin{aligned} SK &= \sqrt{(SH^2 - HK^2)} = \sqrt{((4x^2 / 9) - (39x^2 / 100))} = \\ &= x\sqrt{((400 - 351) / 900)} = x\sqrt{(49/900)} = 7x/30 \\ BK &= 5x/6 - 7x/30 = (25x - 7x) / 30 = 18x / 30 = 9x / 15 = 3x / 5 \\ A)OTV: &7 / 18 \end{aligned}$$



$$\begin{aligned} SC &= SB = 5x/6 \\ CB &= x \\ SW &= 2x/3 \\ S(SCB) &= \frac{1}{2} CB * SW = x/2 * 2x/3 = x^2 / 3 \\ S &= \frac{1}{2} CK * SB \quad AK = CK = x^2/3 / (5x/12) = 12x / 15 = 4x/5 \end{aligned}$$

$$HK = x\sqrt{39} / 10$$

$$\begin{aligned} \cos \angle HKC &= HK / KC = (x\sqrt{39}/10) / \\ AC^2 &= CK^2 + AK^2 - 2AK*CK * \cos \angle AKC \\ \cos \angle AKC &= (-AC^2 + CK^2 + AK^2) / (2*AK*CK) = (-x^2 + 2(16x^2/25)) / (32x^2 / 25) = (-1 + 2(16/25)) / (32/25) = \\ &= (-1 + 32/25) / 32/25 = 7/25 / 32/25 = 7 / 32 \\ \angle AKC &= \arccos(7/32) \end{aligned}$$

$$\begin{aligned} A)OTV: &7/18 \\ B)OTV: &\arccos(7/32) \end{aligned}$$