5.54.

H (visina stupa) = 4m

h (dio stupa iznad površine vode) = 1m

d (dio stupa u vodi) = d

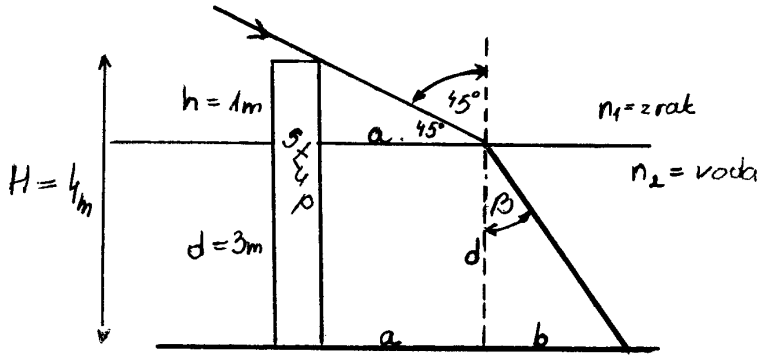
$\alpha = 45°$

n_1 (zrak) = 1,00

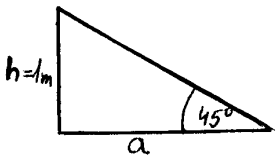
n_2 (voda) = 1,33

---

x (duljina sjene stupa na dnu jezera) = ?



x (duljina sjene stupa) jednaka je zbroju duljina a i b => vidi sliku; pomoću trigonometrije naći ćemo ove nepoznanice.



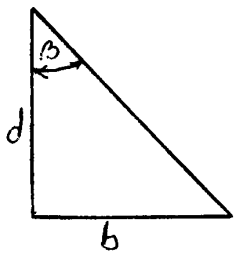
$$tg\alpha = \frac{h}{a}$$

$$a = \frac{h}{tg\alpha} = \frac{1m}{tg\,45°} = \frac{1m}{1} = 1m$$

$$n_{2,1} = \frac{n_2}{n_1} = \frac{1,33}{1} = 1,33$$

$$n = \frac{\sin\alpha}{\sin\beta} \qquad \sin\beta = \frac{\sin\alpha}{n} = \frac{\sin 45°}{1,33} = \frac{0,707}{1,33} = 0,532$$

$$\beta = \sin^{-1} 0,532 = 32,14° = 32° 8'$$



$$tg\beta = \frac{b}{d}$$

$$b = d \cdot tg\beta = 3 \cdot tg\,32,14° = 3 \cdot 0,628 = 1,884\,m$$

$$x = a + b = 1m + 1,884\,m = 2,884\,m \approx 2,9\,m$$

Duljina stupa sjene x na dnu jezera je 2,9 m.