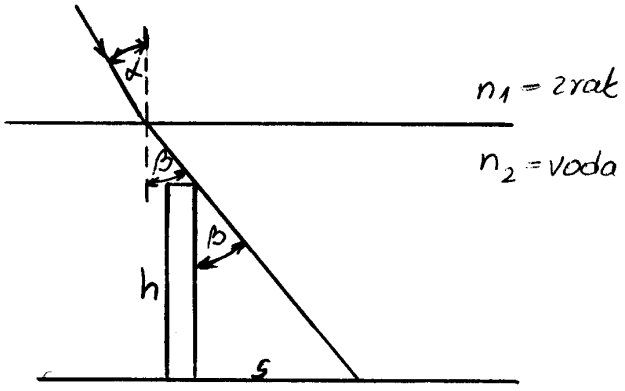
5.55.

h (duljina štapa) $= 1\,m$
n_1 (zraka) $= 1,00$
n_2 (vode) $= 1,33$
a) $\alpha = 60°$
b) $\alpha = 40°$
c) $\alpha = 20°$

$s = ?$ (duljina sjene)



$$tg\,\beta = \frac{s}{h} \qquad s = h \cdot tg\,\beta$$

$$n = n_{21} = \frac{n_2}{n_1} = \frac{1,33}{1} = 1,33$$

$$n = \frac{\sin\alpha}{\sin\beta} \qquad \sin\beta = \frac{\sin\alpha}{n}$$

a) $\alpha = 60°$, $n = 1,33$, $h = 1\,m$, $s = ?$

$$\sin\beta = \frac{\sin 60°}{1,33} = \frac{0,866}{1,33} = 0,651$$

$$\beta = \sin^{-1} 0,651 = 40,62°$$

$$s = h \cdot tg\,\beta = 1 \cdot tg\,40,62° = 0,858\,m \approx 0,86\,m$$

b) $\alpha = 40°$, $n = 1,33$, $h = 1\,m$, $s = ?$

$$\sin\beta = \frac{\sin 40°}{1,33} = \frac{0,643}{1,33} = 0,483$$

$$\beta = \sin^{-1} 0,483 = 28,91°$$

$$s = h \cdot tg\,\beta = 1 \cdot tg\,28,91° = 1 \cdot 0,552 = 0,55\,m$$

c) $\alpha = 20°$, $n = 1,33$, $h = 1\,m$, $s = ?$

$$\sin\beta = \frac{\sin 20°}{1,33} = \frac{0,342}{1,33} = 0,257$$

$$\beta = \sin^{-1} 0,257 = 14,9°$$

$$s = h \cdot tg\,\beta = 1 \cdot tg\,14,9° = 1 \cdot 0,266 = 0,27\,m$$

5.56.

n_1 (voda) $= 1,33$
n_2 (zrak) $= 1$
$\alpha = 30°$
$\beta = ?$

$$n = n_{21} = \frac{n_2}{n_1} = \frac{1}{1,33} = 0,75$$

$$n = \frac{\sin\alpha}{\sin\beta} \qquad \sin\beta = \frac{\sin\alpha}{n} = \frac{\sin 30°}{0,75} = \frac{0,5}{0,75} =$$

$$\sin\beta = 0,6667 \qquad \beta = \sin^{-1} 0,67 = 42°$$