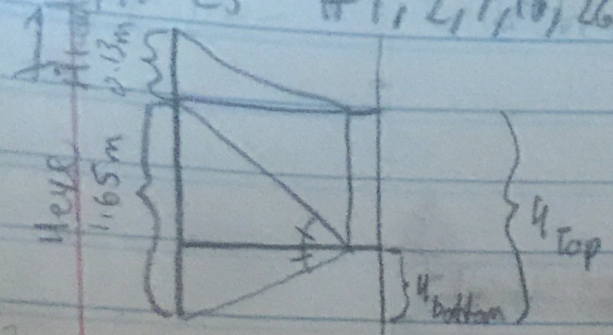
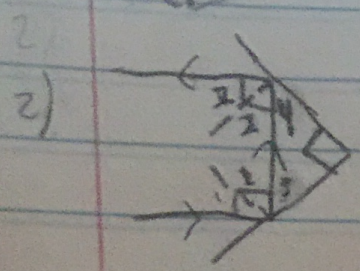


HW 25 #1, 2, 7, 10, 26, 40, 55 Alex/leh



$$H_{\text{bottom}} = H_{\text{eye}}/2 = 1.65/2 = 0.825 \text{ m}$$

$$H_{\text{top}} = H_{\text{eye}} + H_{\text{head}}/2 = 1.65 + \frac{0.13}{2} = 1.72 \text{ m}$$

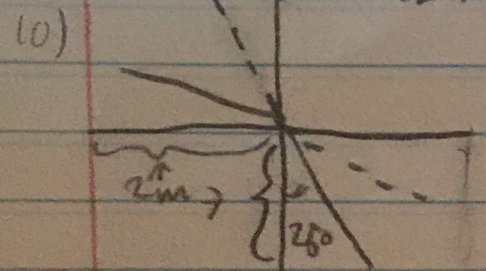


$$\angle 1 + \angle 3 = 90^\circ \quad \angle 3 + \angle 4 = 90^\circ$$

$$\angle 2 + \angle 4 = 90^\circ \quad \text{Therefore } \angle 1 + \angle 2 = 90^\circ$$

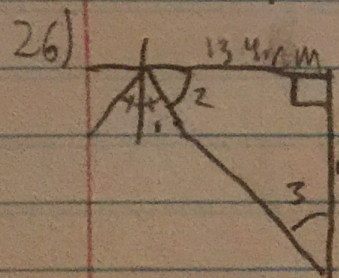
$2\angle 1 + 2\angle 2 = 180^\circ$ which means the light gets reflected back parallel to the ray that came in.

7) $n = c/v = 2.997 \times 10^8 / 2.012 \times 10^8 = 1.49$, probably polystyrene



$$n_1 \sin \theta_1 = n_2 \sin \theta_2$$

$$\theta_2 = \sin^{-1} \left(\frac{n_1 \sin \theta_1}{n_2} \right) = \sin^{-1} \left(\frac{1.33 \cdot \sin(25)}{1} \right) = 34.28^\circ$$



$$\angle 3 = \tan^{-1}(13.4/45) = 16.8^\circ$$

$$\angle 1 = 90 - \angle 2 = 90 - (180 - 90 - \angle 3) = 180 - 180 + \angle 3 = \angle 3$$

$$n_2 \sin(\angle 1) = n_1 \sin(90^\circ) = 1$$

$$n_2 = 1/\sin(16.8) = 1.5, \text{ probably benzene}$$

40) $\frac{1}{f} = \frac{1}{d_i} + \frac{1}{d_o}$, $d_o = \left(\frac{1}{f} - \frac{1}{d_i} \right)^{-1} = \left(\frac{1}{0.035} - \frac{1}{0.75} \right)^{-1} = 0.0367 \text{ m}$

55) a) $f = \frac{3}{2} = 1.5 \text{ cm} = 0.015 \text{ m}$

b) $F = \frac{1}{P}$, $P = \frac{1}{F} = \frac{1}{0.015} = 66.7 \text{ D}$