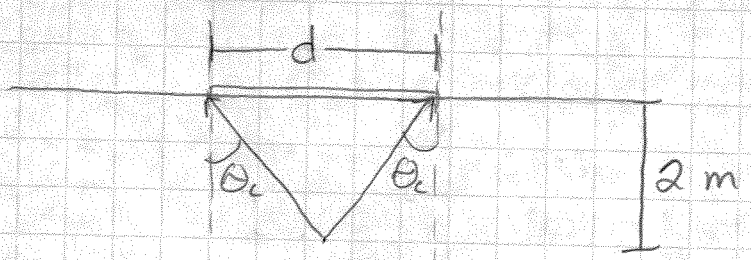
P # 40

Ch 22



The diamond will be hidden when light from the diamond strikes the surface at θ_c so that no light will refract into air

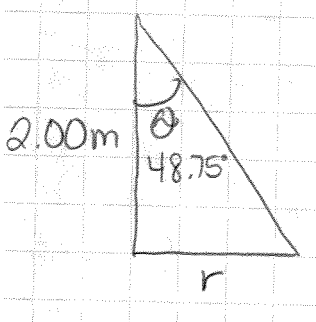
Water $n_1 = 1.33$
Air $n_2 = 1.00$

$$\theta_c = \sin^{-1}\left(\frac{n_2}{n_1}\right)$$

$$= \sin^{-1}\left(\frac{1.00}{1.33}\right)$$

$$\theta_c = 48.75°$$

By geometry, find the radius of the raft



$\tan\theta = \frac{opp}{adj}$ so $opp = adj \cdot \tan\theta$

$r = (2.00\text{m}) \cdot \tan(48.75°)$

$r = 2.28\ \text{m}$

$d = 2 \cdot r = 2 \cdot (2.28\ \text{m})$

$\boxed{d = 4.56\text{m}}$