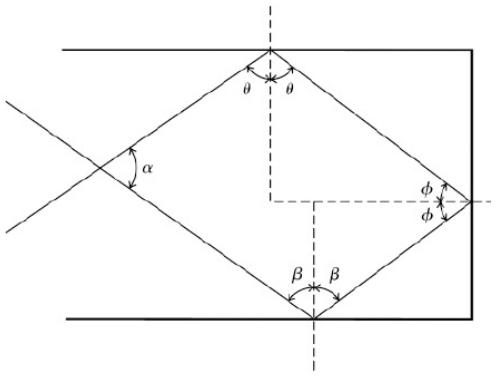
HW Solution 2

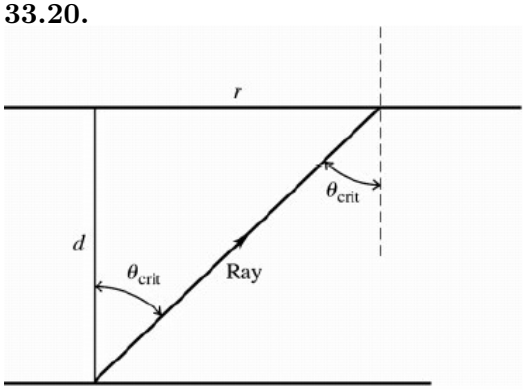
September 7, 2010

33.2.



(a) $\theta + \phi = 90^o$ and $\beta + \phi = 90^o \therefore\ \beta = \theta$
$\frac{\alpha}{2} + \beta = 90^o$ and $\alpha = 180^o - 2\theta$
(b) $\theta = \frac{1}{2}(180^o - \alpha) = \frac{1}{2}(180^o - 45^o) = 45^o$

33.20.



As show in the figure, $r = dtan\theta_{crit}$.
$\because n_a sin\theta_{crit} = n_b sin(90^o)$ and $n_a = 1.333$, $n_b = 1.00$
$\therefore \theta_{crit} = 48.6^o$, $r = 11.3cm$, $A = \pi r^2 = 401m^2$

33.46.
$\theta_b = arcsin(\frac{n_a}{n_b} sin\theta_a) = 36^o$.
$\therefore$ the distance along the bottom of the pool from directly below where the light enters to where it hits the bottom is
$x = (4.0m)tan\theta_b = 2.9m$.
$x_{totle} = 1.5m + x = 4.4m$