

1. In the diagram shown the prism is an equilateral triangle.  $\theta_2 = 42^\circ$  and is the critical angle.  
**SHOW ALL WORK**

- (a) Find the angle of the refracted beam that crosses the top interface.

$$\sin \theta_c = \frac{n_{to}}{n_{from}}$$

$$\sin 42^\circ = \frac{1}{n_{from}}$$

$$n = 1.494$$

Using geometry...

$$90 - \theta_2 = 48^\circ$$

$$180 - 48 - 60 = 72$$

$$90 - 72 = 18$$

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

$$1 \sin \theta_1 = 1.494 \sin 18^\circ$$

$$\theta_1 = 27.5^\circ$$

- (b) Find the angle that the light escapes at,  $\phi$ .

The inside angle is the same,  $18^\circ$ .

$$\phi = 27.5^\circ$$