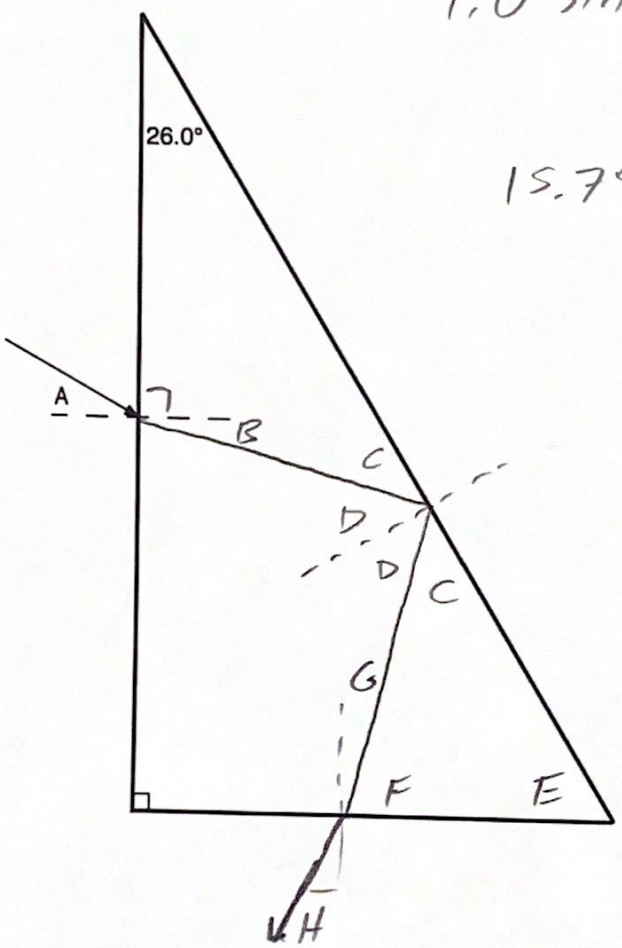
Quiz 25.1C

A light ray is incident on the bottom face of a rectangular prism as shown below. The angle of incidence A = 25.2°. The index of refraction of the prism is 1.57. The prism is surrounded by air. You may assume that if light reflects off the right side (hypotenuse) of the prism, it will next encounter the bottom (shortest) side of the prism.

Find which face (clearly indicate on your diagram) that the light ray exits the prism and with what final angle of refraction.



$1.0 \sin 25.2° = 1.57 \sin B$

$\Rightarrow B = 15.7°$

$15.7° + 90 + 26.0 + C = 180°$

$\Rightarrow C = 48.3°$

$C + D = 90°$

$\Rightarrow D = 41.7°$

$\theta_c = \sin^{-1}\left(\frac{1}{1.57}\right) = 39.6°$

Since $D > \theta_c$, reflects

$90 + 26.0 + E = 180$

$\Rightarrow E = 64°$

$E + C + F = 180°$

$\Rightarrow F = 67.7°$

$F + G = 90$

$\Rightarrow G = 22.3°$

$1.57 \sin 22.3 = 1.0 \sin H$

$\Rightarrow \boxed{H = 36.7°}$