Given a 40°-50°-90° prism as shown with an index of refraction of 1.65. Light is incident from air perpendicular to the base. Calculate from which face, A or B, the light leaves the prism, and show on a clear drawing its direction, with a numerical value for the angle.

Critical angle \( \theta_c = \sin \left( \frac{1}{1.65} \right) \)

\[ = 37.3° \ (\pm 2°) \]

\( \theta_1 = 50° \)

\( \theta_2 = 180° - \left[ (180° - 50° + 40°) \right] \)

\[ = 10° \]

\( n_{\text{air}} \sin \theta_2 = n \sin \theta_2 \ (\pm 2°) \)

\( \theta_f = \sin^{-1} \left( \frac{n}{n_{\text{air}}} \sin \theta_2 \right) \)

\( (n_{\text{air}} = 1) \)

\[ = \sin^{-1} \left( \frac{1.65}{1} \sin 10° \right) \]

\[ = 16.6° \]

\( \theta_f = 16.6° \)