A 5 m long pole extends vertically from the bottom of a swimming pool to a point 3 m above the water. Sunlight is incident at 60 degrees above the horizon. What is the length of the shadow of the pole on the level bottom of the pool? (index of refraction for water is 1.3)

\[ N_1 \sin \theta_1 = N_2 \sin \theta \]

\[ 1 \sin 30 = 1.3 \sin \theta \]

\[ \theta = 22.6^\circ \]

\[ \text{Shadow} = x_1 + x_2 \]

\[ \tan 22.6^\circ = \frac{x_1}{2} \]

\[ x_1 = 0.83 \text{ m} \]

\[ \text{Shadow} = 0.83 + 1.73 = 2.56 \text{ m} \]

\[ \tan 60 = \frac{3}{x_2} \]

\[ x_2 = 1.73 \text{ m} \]