



Question 20:

$$\begin{aligned}
 & \left( \sin^2 25^\circ + \sin^2 65^\circ \right) \\
 & \quad + \sqrt{3} \left( \tan 5^\circ \tan 15^\circ \tan 30^\circ \tan 75^\circ \tan 85^\circ \right) \\
 & = \left( \sin^2 25^\circ + \sin^2 (90^\circ - 25^\circ) \right) \\
 & \quad + \sqrt{3} \left( \tan 5^\circ \tan 15^\circ \tan 30^\circ \tan (90^\circ - 15^\circ) \tan (90^\circ - 5^\circ) \right) \\
 & = \left( \sin^2 25^\circ + \cos^2 25^\circ \right) + \sqrt{3} \left[ \tan 5^\circ \tan 15^\circ \times \frac{1}{\sqrt{3}} \cot 15^\circ \cot 5^\circ \right] \\
 & = 1 + (\tan 5^\circ \cot 5^\circ)(\tan 15^\circ \cot 15^\circ) \quad [\tan \theta \times \cot \theta = 1] \\
 & = 1 + 1 \times 1 = 2
 \end{aligned}$$

Question 21:

$$\begin{aligned}
 & \frac{\sin^2 40^\circ + \sin^2 50^\circ}{\cos^2 20^\circ + \cos^2 70^\circ} + \tan 10^\circ \tan 20^\circ \tan 60^\circ \tan 70^\circ \tan 80^\circ \\
 & = \frac{\sin^2 40^\circ + \sin^2 (90^\circ - 40^\circ)}{\cos^2 20^\circ + \cos^2 (90^\circ - 20^\circ)} + \tan 10^\circ \tan 20^\circ \tan 60^\circ \\
 & \quad \times \tan (90^\circ - 20^\circ) \tan (90^\circ - 10^\circ) \\
 & = \frac{\sin^2 40^\circ + \cos^2 40^\circ}{\cos^2 20^\circ + \sin^2 20^\circ} + \tan 10^\circ \tan 20^\circ \tan 60^\circ \cot 20^\circ \cot 10^\circ \\
 & = \frac{1}{1} + \left( \tan 10^\circ \times \frac{1}{\tan 10^\circ} \right) \left( \tan 20^\circ \times \frac{1}{\tan 20^\circ} \right) \tan 60^\circ \\
 & = 1 + 1 \times 1 \times \sqrt{3} = \sqrt{3} + 1
 \end{aligned}$$

\*\*\*\*\* END \*\*\*\*\*