

Question 18:

$$\frac{-\tan\theta\cot(90^{\circ}-\theta) + \sec\theta\cos\sec(90^{\circ}-\theta) + \sin^{2}35^{\circ} + \sin^{2}55^{\circ}}{\tan 10^{\circ}\tan 20^{\circ}\tan 30^{\circ}\tan 70^{\circ}\tan 80^{\circ}} = \frac{-\tan^{2}\theta + \sec^{2}\theta + \sin^{2}(90^{\circ}-55^{\circ}) + \sin^{2}55^{\circ}}{\tan 10^{\circ}\tan 20^{\circ}\tan 30^{\circ}\tan(90^{\circ}-20^{\circ})\tan(90^{\circ}-10^{\circ})} = \frac{1+\cos^{2}55^{\circ} + \sin^{2}55^{\circ}}{\tan 10^{\circ}\tan 20^{\circ}\tan 30^{\circ} \times \cot 20^{\circ}\cot 10^{\circ}} = \frac{1+1}{\tan 10^{\circ}\tan 20^{\circ} \times \frac{1}{\sqrt{3}} \times \frac{1}{\tan 20^{\circ}} \times \frac{1}{\tan 10^{\circ}}} = \frac{1+\cos^{2}\theta + \sin^{2}\theta = 1 \text{ and } \tan 30^{\circ} = \frac{1}{\sqrt{3}}}{\sin 10^{\circ}\tan 20^{\circ} \times \frac{1}{1}} = 2\sqrt{3}$$

Question 19: