

$$12. \quad \tan X - \sqrt{2} \sec X = -1$$

$$\frac{\sin X}{\cos X} - \sqrt{2} \cdot \frac{1}{\cos X} = -1$$

$$\cancel{\cos X} \left( \frac{\sin X}{\cancel{\cos X}} \right) - \frac{\sqrt{2}}{\cancel{\cos X}} (\cancel{\cos X}) = -1 (\cancel{\cos X})$$

$$\sin X - \sqrt{2} = -\cos X$$

$$(\sin X - \sqrt{2})^2 = (-\cos X)^2$$

$$(\sin X - \sqrt{2})(\sin X - \sqrt{2}) = \cos^2 X$$

$$\sin^2 X - \sqrt{2} \sin X - \sqrt{2} \sin X + 2 = 1 - \sin^2 X$$

$$\sin^2 X + \sin^2 X - 2\sqrt{2} \sin X + 2 - 1 = 0$$

$$2 \sin^2 X - 2\sqrt{2} \sin X + 1 = 0$$

$$(\sqrt{2} \sin X - 1)(\sqrt{2} \sin X - 1) = 0$$

$$\sqrt{2} \sin X - 1 = 0$$

$$\sqrt{2} \sin X = 1$$

$$\sin X = \frac{1}{\sqrt{2}}$$

$$\sin X = \frac{\sqrt{2}}{2}$$
$$X = \left( \frac{\pi}{4} \right), \cancel{\left( \frac{3\pi}{4} \right)}$$
$$X = \frac{\pi}{4}$$