

$$1. \sin^2 X = \frac{1}{4} \quad / \sqrt{}$$

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

$$X = 30^\circ + 360^\circ k$$

$$X = 150^\circ + 360^\circ k$$

$$X = -30^\circ + 360^\circ k$$

$$X = 210^\circ + 360^\circ k$$

$$2. \sqrt{2} \sin X - 2 \sin X \cos X = 0$$

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

$$\sqrt{2} \sin X = 0 \quad / : \sqrt{2}$$

$$\sin X = 0$$

$$X = 180^\circ k$$

$$\sqrt{2} \cos X = 1 \quad / : \sqrt{2}$$

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

$$X = \pm 45^\circ + 360^\circ k$$

$$3. \sin^2 X - \sin X - 2 = 0$$

$$\begin{cases} t = \sin X \\ t^2 - t - 2 = 0 \end{cases}$$

$$t_1 = 2 \quad t_2 = -1$$

$$\sin X = 2$$

$$\sin X = -1$$

$$X = -90^\circ + 360^\circ k$$

$$4. 2 \cos^2 2X = \cos 2X + 1$$

$$2 \cos^2 2X - \cos 2X - 1 = 0$$

$$\begin{cases} \cos 2X = t \\ 2t^2 - t - 1 = 0 \end{cases}$$

$$t = 1 \quad t = -\frac{1}{2}$$

$$\cos 2X = 1$$

$$\cos 2X = -\frac{1}{2}$$

$$2X = 360^\circ k$$

$$2X = \pm 120^\circ + 360^\circ k$$

$$X = 180^\circ k$$

$$X = \pm 60^\circ + 180^\circ k$$

$$5. \cos(5x - 75^\circ) = \frac{\sqrt{3}}{2}$$

$$5x - 75^\circ = \pm 30^\circ + 360^\circ k$$

$$5x = 105^\circ + 360^\circ k$$

$$x = 21^\circ + 72^\circ k$$

$$5x = 45^\circ + 360^\circ k$$

$$x = 9^\circ + 72^\circ k$$

$$6. \cos^2 2x = \frac{1}{2} \quad | \sqrt{\quad}$$

$$\cos 2x = \pm \frac{1}{\sqrt{2}}$$

$$2x = \pm 45^\circ + 360^\circ k$$

$$2x = \pm 135^\circ + 360^\circ k$$

$$x = \pm 22.5^\circ + 180^\circ k$$

$$x = \pm 67.5^\circ + 180^\circ k$$

$$7. \sin(3x - 30^\circ) = \sin 75^\circ$$

$$3x - 30^\circ = 75^\circ + 360^\circ k \rightarrow 3x = 105^\circ + 360^\circ k \rightarrow x = 35^\circ + 120^\circ k$$

$$3x - 30^\circ = 105^\circ + 360^\circ k \quad 3x = 135^\circ + 360^\circ k \rightarrow x = 45^\circ + 120^\circ k$$

$$8. \operatorname{tg}(5x + 15^\circ) = \operatorname{tg} 95^\circ$$

$$5x + 15^\circ = 95^\circ + 180^\circ k$$

$$5x = 80^\circ + 180^\circ k$$

$$x = 16^\circ + 36^\circ k$$

$$9. \sin 7x = \sin x$$

$$7x = x + 360^\circ k$$

$$6x = 360^\circ k$$

$$x = 60^\circ k$$

$$7x = 180^\circ - x + 360^\circ k$$

$$8x = 180^\circ + 360^\circ k$$

$$x = 22.5^\circ + 45^\circ k$$

$$11. \cos^2 X + \sin X = 1$$

$$\left\{ \begin{array}{l} \sin^2 X + \cos^2 X = 1 \\ \cos^2 X = 1 - \sin^2 X \end{array} \right\}$$

$$1 - \sin^2 X + \sin X = 1$$

$$-\sin^2 X + \sin X = 0$$

$$\sin X (1 - \sin^2 X) = 0$$

$$\downarrow$$
$$\sin X = 0$$

$$X = 180^\circ k$$

$$\sin^2 X = 1/5$$

$$\sin X = \pm 1/\sqrt{5}$$

$$X = 90^\circ + 360^\circ k, X = 270^\circ + 360^\circ k$$

$$12. 2\sin^2 X + \cos X = 2$$

$$(\sin^2 X = 1 - \cos^2 X)$$

$$2(1 - \cos^2 X) + \cos X = 2$$

$$2 - 2\cos^2 X + \cos X = 2$$

$$-2\cos^2 X + \cos X = 0$$

$$\cos X (-2\cos X + 1) = 0$$

$$\downarrow$$
$$\cos X = 0$$

$$X = 90^\circ + 180^\circ k$$

$$\downarrow$$
$$2\cos X = 1$$

$$\cos X = 1/2$$

$$X = \pm 60^\circ + 360^\circ k$$

$$13. 3\sin^2 X + \cos^2 X = 3\sin X$$

$$(\cos^2 X = 1 - \sin^2 X)$$

$$3\sin^2 X + 1 - \sin^2 X = 3\sin X$$

$$2\sin^2 X - 3\sin X + 1 = 0$$

$$\sin X = t$$

$$2t^2 - 3t + 1 = 0$$

$$t = 1 \quad t = 1/2$$

$$\sin X = 1$$

$$X = 90^\circ + 360^\circ k$$

$$\sin X = 1/2$$

$$X = 30^\circ + 360^\circ k$$

$$X = 150^\circ + 360^\circ k$$

$$14. \cos^2 X - \sin^2 X = 3\cos X + 1$$

$$(\sin^2 X = 1 - \cos^2 X)$$

$$\cos^2 X - 1 + \cos^2 X = 3\cos X + 1$$

$$2\cos^2 X - 3\cos X - 2 = 0$$

$$\cos X = t$$

$$2t^2 - 3t - 2 = 0$$

$$t = 2 \quad t = -\frac{1}{2}$$

$$\cos X = 2$$

$$\cos X = -\frac{1}{2}$$

mirrored

$$X = \pm 120^\circ + 360^\circ k$$

$$15. \sin X = 2\cos X \quad /: \cos X$$

$$\tan X = 2$$

$$X = 63.43^\circ + 180^\circ k$$

$$16. 5\sin X - 2\cos X = 0$$

$$5\sin X = 2\cos X \quad /: \cos X$$

$$5\tan X = 2$$

$$\tan X = \frac{2}{5}$$

$$X = 21.80^\circ + 180^\circ k$$