Solve the following problems in the real domain.

(1)

$$2\cos x + 1 = 0$$

$$\left[\pm\tfrac{2}{3}\pi + 2k\pi\right]$$

(2)

$$(3\cos x + 7)(-2\sin x - 1) = 0$$

$$\left[-\tfrac{1}{6}\pi + 2k\pi, \tfrac{5}{6}\pi + 2k\pi\right]$$

(3)

$$(6\tan 2x - 2)(2\tan 2x - 6) = 0$$

$$\left[\tfrac{1}{2}\arctan\tfrac{1}{3} + \tfrac{1}{2}k\pi, \tfrac{1}{2}\arctan 3 + \tfrac{1}{2}k\pi\right]$$

(4)

$$\sin 2x = -\sin(-x)$$

$$\left[k\pi, \pm\tfrac{1}{3}\pi + 2k\pi\right]$$

(5)

$$\sin x + \sqrt{3}\cos x = 2$$

$$\left[\tfrac{1}{6}\pi + 2k\pi\right]$$

(6)

$$4\sin^3 x + 4\sin^2 x - 3\sin x = 3$$

$$\left[\tfrac{1}{3}\pi + 2k\pi, \tfrac{2}{3}\pi + 2k\pi, \tfrac{4}{3}\pi + 2k\pi, \tfrac{3}{2}\pi + 2k\pi, \tfrac{5}{3}\pi + 2k\pi\right]$$

(7)

$$\tan(-x + \tfrac{\pi}{6}) = \sqrt{3}$$

$$\left[-\tfrac{\pi}{6} + k\pi\right]$$

(8)

$$2|\cos x| = \sin^2 x.$$

$$\left[\pm\arccos(\sqrt{2} - 1) + k\pi\right]$$

(9)

$$\cos|x| = \sin x$$

$$\left[\tfrac{1}{4}\pi + 2k\pi, \tfrac{5}{4}\pi + 2k\pi\right]$$

(10)

$$|\sin x| = \cos^2 x$$

$$\left[\pm\arcsin\left(\tfrac{1}{2}(\sqrt{5} - 1)\right) + k\pi\right]$$

(11)

$$\sin|x| = \cos x$$

$$\left[\tfrac{1}{4}\pi + 2k\pi, k \geq 0; \tfrac{5}{4}\pi + 2k\pi, k \geq 0; -\tfrac{1}{4}\pi + 2k\pi, k \leq 0; -\tfrac{5}{4}\pi + 2k\pi, k \leq 0\right]$$

In all cases we assume $k \in \mathbf{Z}$.