1. Solve the given equation.

(a) $\sin\theta = \frac{1}{2}$ (b) $\cos\theta = -\frac{\sqrt{3}}{2}$ (c) $\sin\theta = 0$ (d) $\cos\theta = \frac{\sqrt{2}}{2}$ (e) $\sin\theta = \frac{\sqrt{3}}{2}$

(f) $\cos\theta = -1$ (g) $\sin\theta = -1$ (h) $\cos\theta = 0$ (i) $\sin\theta = -\frac{\sqrt{2}}{2}$ (j) $\cos\theta = 3$

(k) $\sin\theta = -\frac{1}{2}$ (l) $\cos\theta = \frac{1}{2}$ (m) $\cos\theta = 1$ (n) $\sin\theta = 1$ (o) $\cos\theta = -\frac{\sqrt{2}}{2}$

(p) $\tan\theta = -\sqrt{3}$ (q) $\tan\theta = -\frac{\sqrt{3}}{3}$ (r) $\tan\theta = 0$ (s) $\tan\theta = -1$ (t) $\tan\theta = \frac{\sqrt{3}}{3}$

2. Find all solutions to the given equation.

(a) $\sin\theta = \cos\theta$

(b) $2\cos\theta + 1 = 0$

(c) $\sqrt{2}\sin\theta + 1 = 0$

(d) $\cot\theta - 1 = 0$

(e) $\sqrt{3}\tan\theta - 1 = 0$

(f) $\sin\theta = \csc\theta$

(g) $\cos\theta = \sec\theta$

(h) $\sin\theta + 1 = 0$

3. Solve the given equation for $\theta \in [0, 2\pi]$. (Hint: You may need to factor or use an identity.)

(a) $2\sin^2\theta - 1 = 0$

(b) $4\cos^2\theta - 3 = 0$

(c) $2\sin^3\theta - \sin\theta = 0$

(d) $2\cos^2\theta - \sqrt{3}\cos\theta = 0$

(e) $\sin\theta(2\cos\theta + 1) = 0$

(f) $\cos\theta\sin\theta = \cos\theta$

(g) $\sin^2\theta - \sin\theta - 2 = 0$

(h) $\sin^2\theta - 3 = 2\sin\theta$

(i) $\sin(2\theta) + \cos\theta = 0$

(j) $\sin(2\theta) = \sin\theta$

(k) $2\tan\theta = \sec\theta$

(l) $2\tan\theta\sin^2\theta = \tan\theta$

(m) $2\sin^2\theta + \sin\theta - 1 = 0$

(n) $\sin^2\theta = \sin\theta - \cos^2\theta$

(o) $\sec\theta\csc\theta = 2\csc\theta$

(p) $\tan\theta\sec\theta = 2\tan\theta$

Answers

1. (a) $\theta = \frac{\pi}{6} + 2k\pi$, $\theta = \frac{5\pi}{6} + 2k\pi$, for $k \in \mathbb{Z}$

   (b) $\theta = \frac{5\pi}{6} + 2k\pi$, $\theta = \frac{7\pi}{6} + 2k\pi$, for $k \in \mathbb{Z}$

   (c) $\theta = k\pi$, for $k \in \mathbb{Z}$

   (d) $\theta = \frac{\pi}{4} + 2k\pi$, $\theta = \frac{7\pi}{4} + 2k\pi$, for $k \in \mathbb{Z}$

   (e) $\theta = \frac{\pi}{3} + 2k\pi$, $\theta = \frac{2\pi}{3} + 2k\pi$, for $k \in \mathbb{Z}$

   (f) $\theta = \pi + 2k\pi$, for $k \in \mathbb{Z}$

   (g) $\theta = \frac{3\pi}{2} + 2k\pi$, for $k \in \mathbb{Z}$

   (h) $\theta = \frac{\pi}{2} + k\pi$, for $k \in \mathbb{Z}$

   (i) $\theta = \frac{5\pi}{4} + 2k\pi$, $\theta = \frac{7\pi}{4} + 2k\pi$, for $k \in \mathbb{Z}$

   (j) No solution

   (k) $\theta = \frac{7\pi}{6} + 2k\pi$, $\theta = \frac{11\pi}{6} + 2k\pi$, for $k \in \mathbb{Z}$

   (l) $\theta = \frac{\pi}{3} + 2k\pi$, $\frac{5\pi}{3} + 2k\pi$, for $k \in \mathbb{Z}$

   (m) $\theta = 2k\pi$, for $k \in \mathbb{Z}$

   (n) $\theta = \frac{\pi}{2} + 2k\pi$, for $k \in \mathbb{Z}$

   (o) $3\pi/4 + 2k\pi, 5\pi/4 + 2k\pi$, for $k \in \mathbb{Z}$

   (p) $\theta = \frac{2\pi}{3} + k\pi$, for $k \in \mathbb{Z}$

   (q) $\theta = \frac{5\pi}{6} + k\pi$, for $k \in \mathbb{Z}$

   (r) $\theta = k\pi$, for $k \in \mathbb{Z}$

   (s) $\theta = \frac{3\pi}{4} + k\pi$, for $k \in \mathbb{Z}$

   (t) $\theta = \frac{\pi}{6} + k\pi$, for $k \in \mathbb{Z}$

2. (a) $\theta = \frac{\pi}{4} + k\pi$, for $k \in \mathbb{Z}$

   (b) $\theta = \frac{2\pi}{3} + 2k\pi$, $\theta = \frac{4\pi}{3} + 2k\pi$, for $k \in \mathbb{Z}$

   (c) $\theta = \frac{5\pi}{4} + 2k\pi$, $\frac{7\pi}{4} + 2k\pi$, for $k \in \mathbb{Z}$

   (d) $\theta = \frac{\pi}{4} + k\pi$, for $k \in \mathbb{Z}$

   (e) $\theta = \frac{\pi}{6} + k\pi$

   (f) $\theta = \frac{\pi}{2} + k\pi$, for $k \in \mathbb{Z}$

   (g) $\theta = k\pi$, for $k \in \mathbb{Z}$

   (h) $\theta = \frac{3\pi}{2} + 2k\pi$, for $k \in \mathbb{Z}$

3. (a) $\theta = \frac{\pi}{4}, \frac{3\pi}{4}, \frac{5\pi}{4}, \frac{7\pi}{4}$

(b) $\theta = \frac{\pi}{6}, \frac{5\pi}{6}, \frac{7\pi}{6}, \frac{11\pi}{6}$

(c) $\theta = 0, \frac{\pi}{4}, \frac{3\pi}{4}, \pi, \frac{5\pi}{4}, 2\pi, \frac{7\pi}{4}$

(d) $\theta = \frac{\pi}{6}, \frac{\pi}{2}, \frac{3\pi}{2}, \frac{11\pi}{6}$

(e) $\theta = 0, \frac{2\pi}{3}, \pi, \frac{4\pi}{3}, 2\pi$

(f) $\theta = \frac{\pi}{2}, \frac{3\pi}{2}$

(g) $\theta = \frac{3\pi}{2}$

(h) $\theta = \frac{3\pi}{2}$

(i) $\theta = \frac{\pi}{2}, \frac{7\pi}{6}, \frac{3\pi}{2}, \frac{11\pi}{6}$

(j) $\theta = 0, \frac{\pi}{3}, \pi, \frac{5\pi}{3}, 2\pi$

(k) $\theta = \frac{\pi}{6}, \frac{5\pi}{6}$

(l) $\theta = 0, \frac{\pi}{4}, \frac{3\pi}{4}, \pi, \frac{5\pi}{4}, \frac{7\pi}{4}, 2\pi$

(m) $\theta = \frac{\pi}{6}, \frac{5\pi}{6}, \frac{3\pi}{2}$

(n) $\theta = \frac{\pi}{2}$

(o) $\theta = \frac{\pi}{3}, \frac{5\pi}{3}$

(p) $\theta = 0, \frac{\pi}{3}, \frac{5\pi}{3}, \pi, 2\pi$