Find all solutions for each equation:

1. $2\cos x - 1 = 0$ $\frac{\pi}{3} + 2\pi k, \frac{5\pi}{3} + 2\pi k$
2. $4\csc\theta + 6 = -2$ $\frac{7\pi}{6} + 2\pi k, \frac{11\pi}{6} + 2\pi k$

Find all values of x on the interval $[0, 2\pi)$.

3. $2\sin^2 x - 1 = 0$ $\frac{\pi}{4}, \frac{3\pi}{4}, \frac{5\pi}{4}, \frac{7\pi}{4}$
4. $2\cos^2 x + \cos x = 0$ $\frac{\pi}{2}, \frac{3\pi}{2}, \frac{2\pi}{3}, \frac{4\pi}{3}$
5. $\sqrt{3}\cot x + 1 = 0$ $\frac{2\pi}{3}, \frac{5\pi}{3}$
6. $1 - \cos^2 x = 1 + \cos x + \cos^2 x$ $\frac{\pi}{2}, \frac{3\pi}{2}, \frac{2\pi}{3}, \frac{4\pi}{3}$
7. $(\tan x - 1)(\sec x - 1) = 0$ $\frac{\pi}{4}, \frac{5\pi}{4}, 0$
8. $\sin^3 x = \sin x$ $0, \pi, \frac{\pi}{2}, \frac{3\pi}{2}$
9. $4(1 - \cos^2 x) = 1 + 4\cos x$ $\frac{\pi}{3}, \frac{5\pi}{3}$
10. $2\sin^2 x + 3\sin x + 1 = 0$ $\frac{7\pi}{6}, \frac{11\pi}{6}, \frac{3\pi}{2}$
11. $2\cos^2 x - \sin x = 1$ $\frac{\pi}{6}, \frac{5\pi}{6}, \frac{3\pi}{2}$
12. $2\sin^2 x = 3(1 - \cos x)$ $\frac{\pi}{3}, \frac{5\pi}{3}, 0$
13. $\csc^2 x = \cot x + 1$ $\frac{\pi}{2}, \frac{3\pi}{2}, \frac{\pi}{4}, \frac{5\pi}{4}$
14. $\sin(3x) = -1$ $\frac{\pi}{2}, \frac{7\pi}{6}, \frac{11\pi}{6}$
15. $\tan\left(\frac{x}{2}\right) = \sqrt{3}$ $\frac{2\pi}{3}$
16. $\cos(3x) = 0$ $\frac{\pi}{6}, \frac{\pi}{2}, \frac{5\pi}{6}, \frac{7\pi}{6}, \frac{3\pi}{2}, \frac{11\pi}{6}$
17. $2\sin(2x) = 1$ $\frac{\pi}{12}, \frac{5\pi}{12}, \frac{13\pi}{12}, \frac{17\pi}{12}$
18. $\sin x = 0.4$ (use a calculator, round to the nearest tenth) 0.4, 2.7
19. $\sec x = -4$ (use a calculator, round to the nearest tenth) 1.8, 4.5
20. $\cos x = -0.9$ (use a calculator, round to the nearest tenth) 2.7, 3.6

Solving Trig Eqns

1. $2\cos x - 1 = 0$

$x = \cos^{-1}\left(\frac{1}{2}\right)$

$\boxed{x = \frac{\pi}{3} + 2\pi k \quad \frac{5\pi}{3} + 2\pi k}$

2. $4\csc\theta + 6 = -2$

$\csc\theta = -2$

$\sin\theta = -\frac{1}{2}$

$\theta = \sin^{-1}\left(-\frac{1}{2}\right)$

$\boxed{\theta = \frac{7\pi}{6} + 2\pi k \quad \frac{11\pi}{6} + 2\pi k}$

3. $2\sin^2 x - 1 = 0$

$\sin^2 x = \frac{1}{2}$

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

$x = \sin^{-1}\left(\pm\frac{\sqrt{2}}{2}\right)$

$\boxed{x = \frac{\pi}{4}, \frac{3\pi}{4}, \frac{5\pi}{4}, \frac{7\pi}{4}}$

4. $2\cos^2 x + \cos x = 0$

$\cos x\,(2\cos x + 1) = 0$

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

$x = \cos^{-1}(0) \qquad x = \cos^{-1}\left(-\frac{1}{2}\right)$

$\boxed{x = \frac{\pi}{2}, \frac{3\pi}{2}, \frac{2\pi}{3}, \frac{4\pi}{3}}$

5. $\sqrt{3}\cot x + 1 = 0$

$\cot x = -\frac{1}{\sqrt{3}}$

$\tan x = -\sqrt{3}$

$x = \tan^{-1}(-\sqrt{3})$

$\boxed{x = \frac{2\pi}{3}, \frac{5\pi}{3}}$

6. $1 - \cos^2 x = 1 + \cos x + \cos^2 x$

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

$0 = \cos x\,(2\cos x + 1)$

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

$x = \cos^{-1}(0) \qquad x = \cos^{-1}\left(-\frac{1}{2}\right)$

$\boxed{x = \frac{\pi}{2}, \frac{3\pi}{2}, \frac{2\pi}{3}, \frac{4\pi}{3}}$

7. $(\tan x - 1)(\sec x - 1) = 0$

$\tan x - 1 = 0 \qquad \sec x - 1 = 0$

$x = \tan^{-1}(1) \qquad \cos x = 1$

$x = \cos^{-1}(1)$

$\boxed{x = \frac{\pi}{4}, \frac{5\pi}{4}, 0}$

8. $\sin^3 x = \sin x$

$\sin^3 x - \sin x = 0$

$\sin x\,(\sin^2 x - 1) = 0$

$\sin x\,(-\cos^2 x) = 0$

$\sin x = 0 \qquad -\cos^2 x = 0$

$x = \sin^{-1}(0) \qquad x = \cos^{-1}(0)$

$\boxed{x = 0, \pi, \frac{\pi}{2}, \frac{3\pi}{2}}$

9. $4(1 - \cos^2 x) = 1 + 4\cos x$

$4 - 4\cos^2 x = 1 + 4\cos x$

$0 = 4\cos^2 x + 4\cos x - 3$

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

$2\cos x + 3 = 0 \qquad 2\cos x - 1 = 0$

$x = \cos^{-1}\left(-\frac{3}{2}\right) \qquad x = \cos^{-1}\left(\frac{1}{2}\right)$

$\boxed{x = \frac{\pi}{3}, \frac{5\pi}{3}}$

10. $2\sin^2 x + 3\sin x + 1 = 0$

$(2\sin x + 1)(\sin x + 1) = 0$

$2\sin x + 1 = 0 \qquad \sin x + 1 = 0$

$x = \sin^{-1}\left(-\frac{1}{2}\right) \qquad x = \sin^{-1}(-1)$

$\boxed{x = \frac{7\pi}{6}, \frac{11\pi}{6}, \frac{3\pi}{2}}$

11. $2\cos^2 x - \sin x = 1$

$2(1 - \sin^2 x) - \sin x = 1$

$2 - 2\sin^2 x - \sin x = 1$

$0 = 2\sin^2 x + \sin x - 1$

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

$2\sin x - 1 = 0 \qquad \sin x + 1 = 0$

$x = \sin^{-1}\left(\frac{1}{2}\right) \qquad x = \sin^{-1}(-1)$

$\boxed{x = \frac{\pi}{6}, \frac{5\pi}{6}, \frac{3\pi}{2}}$

12. $2\sin^2 x = 3(1 - \cos x)$

$2(1 - \cos^2 x) = 3 - 3\cos x$

$2 - 2\cos^2 x = 3 - 3\cos x$

$0 = 2\cos^2 x - 3\cos x + 1$

$0 = (2\cos x - 1)(\cos x - 1)$

$2\cos x - 1 = 0 \qquad \cos x - 1 = 0$

$x = \cos^{-1}\left(\frac{1}{2}\right) \qquad x = \cos^{-1}(1)$

$\boxed{x = \frac{\pi}{3}, \frac{5\pi}{3}, 0}$

13. $\csc^2 x = \cot x + 1$

$\cot^2 x + 1 = \cot x + 1$

$\cot^2 x - \cot x = 0$

$\cot x(\cot x - 1) = 0$

$\cot x = 0; \quad \cot x - 1 = 0$

$x = \cot^{-1}(0) \qquad x = \cot^{-1}(1)$

$\boxed{x = \frac{\pi}{2}, \frac{3\pi}{2}, \frac{\pi}{4}, \frac{5\pi}{4}}$

14. $\sin(3x) = -1$

$3x = \sin^{-1}(-1)$

$3x = \frac{3\pi}{2}, \frac{7\pi}{2}, \frac{11\pi}{2}$

$\boxed{x = \frac{\pi}{2}, \frac{7\pi}{6}, \frac{11\pi}{6}}$

15. $\tan\left(\frac{x}{2}\right) = \sqrt{3}$

$\frac{x}{2} = \tan^{-1}(\sqrt{3})$

$\frac{x}{2} = \frac{\pi}{3}$

$\boxed{x = \frac{2\pi}{3}}$

16. $\cos(3x) = 0$

$3x = \cos^{-1}(0)$

$3x = \frac{\pi}{2}, \frac{3\pi}{2}, \frac{5\pi}{2}, \frac{7\pi}{2}, \frac{9\pi}{2}, \frac{11\pi}{2}$

$\boxed{x = \frac{\pi}{6}, \frac{\pi}{2}, \frac{5\pi}{6}, \frac{7\pi}{6}, \frac{3\pi}{2}, \frac{11\pi}{6}}$

17. $2\sin(2x) = 1$

$2x = \sin^{-1}\left(\frac{1}{2}\right)$

$2x = \frac{\pi}{6}, \frac{5\pi}{6}, \frac{13\pi}{6}, \frac{17\pi}{6}$

$\boxed{x = \frac{\pi}{12}, \frac{5\pi}{12}, \frac{13\pi}{12}, \frac{17\pi}{12}}$

18. $\sin x = 0.4$

$x = \sin^{-1}(0.4)$ 1st & 2nd quad

$x = .412$ $\boxed{x = .4, 2.7}$

$x = \pi - .412$

19. $\sec x = -4$

$\cos x = -\frac{1}{4}$

$x = \cos^{-1}\left(-\frac{1}{4}\right)$ 2nd & 3rd quad

$x = 1.823$

ref $\angle$ is $\pi - 1.823$

1.318

$x = \pi + 1.318$

$\boxed{x = 4.5 \text{ \& } 1.8}$

20. $\cos x = -0.9$

$x = \cos^{-1}(-0.9)$ 2nd & 3rd quad

$x = 2.691$

ref $\angle$ is $\pi - 2.691 = .451$

$x = \pi + .451$

$\boxed{x = 2.7 \text{ and } 3.6}$