Trig Equation Solving Practice

Solve over the interval $0 \leq \theta < 2\pi$

1. $\csc\theta = -2$
2. $6\tan\theta + 6 = 0$
3. $2\cos^2\theta - 5\cos\theta = -2$
4. $\cos^2\theta + \sin\theta + 1 = 0$
5. $\sec^2\theta + \sec\theta - 2 = 0$
6. $(\tan\theta - 1)(\cot\theta) = 0$
7. $4\sin\theta\tan\theta = 3\sec\theta$
8. $2\sin\theta = 7 + 4\csc\theta$
9. $\csc\theta\cot^2\theta = 0$
10. $\csc\theta\tan\theta = \tan\theta$

Find ALL solutions

11. $\sec^2\theta = 1 - \tan\theta$

12. $2\cos^2\theta + 1 = 5\sin\theta$

13. $4\cos\theta = \sec\theta$

14. $3\tan^3\theta\cot\theta = 1$

15. $\frac{\tan^2\theta+1}{\cos\theta} = 2\sec\theta$

16. $2\sin^3\theta + 1 = \cos^2\theta + \sin\theta$

Trig Equation Solving Practice Answers

1. $\theta = \frac{7\pi}{6}$ or $\theta = \frac{11\pi}{6}$
2. $\theta = \frac{3\pi}{4}$ or $\theta = \frac{7\pi}{4}$
3. $\theta = \frac{\pi}{3}$ or $\theta = \frac{5\pi}{3}$
4. $\theta = \frac{3\pi}{2}$
5. $\theta = 0$, $\theta = \frac{2\pi}{3}$, or $\theta = \frac{4\pi}{3}$
6. $\theta = \frac{\pi}{4}$ or $\theta = \frac{5\pi}{4}$
7. $\theta = \frac{\pi}{3}$, $\theta = \frac{2\pi}{3}$, $\theta = \frac{4\pi}{3}$, or $\theta = \frac{5\pi}{3}$
8. $\theta = \frac{7\pi}{6}$ or $\theta = \frac{11\pi}{6}$
9. $\theta = \frac{\pi}{2}$ or $\theta = \frac{3\pi}{2}$
10. No Solution
11. $\theta = \frac{3\pi}{4} + 2\pi k$ or $\theta = \frac{7\pi}{4} + 2\pi k$ or $\theta = 2\pi k$ or $\theta = \pi + 2\pi k$, for any integer k
    (note: this may be written more efficiently as $\theta = \frac{3\pi}{4} + \pi k$ or $\theta = \pi k$ for $k \in \mathbb{Z}$, though writing the solutions in this way is entirely not necessary)
12. $\theta = \frac{\pi}{6} + 2\pi k$ or $\theta = \frac{5\pi}{6} + 2\pi k$, for any integer value of k
13. $\theta = \frac{\pi}{3} + 2\pi k$ or $\theta = \frac{2\pi}{3} + 2\pi k$ or $\theta = \frac{4\pi}{3} + 2\pi k$ or $\theta = \frac{5\pi}{3} + 2\pi k$ for any integer value of k
    (note: this may be written more efficiently as $\theta = \frac{\pi}{3} + \pi k$ or $\theta = \frac{2\pi}{3} + \pi k$ for any integer value of k, though writing the solutions in this way is entirely not necessary)
14. $\theta = \frac{\pi}{6} + 2\pi k$, $\theta = \frac{5\pi}{6} + 2\pi k$, $\theta = \frac{7\pi}{6} + 2\pi k$, or $\theta = \frac{11\pi}{6} + 2\pi k$, for integer values of k
    (alternatively: $\theta = \frac{\pi}{6} + \pi k$ or $\theta = \frac{5\pi}{6} + \pi k$ for $k \in \mathbb{Z}$)
15. $\theta = \frac{\pi}{4} + 2\pi k$, $\theta = \frac{3\pi}{4} + 2\pi k$, $\theta = \frac{5\pi}{4} + 2\pi k$, or $\theta = \frac{7\pi}{4} + 2\pi k$ for integer values of k
    (this can be written very efficiently with just $\theta = \frac{\pi}{4} + \frac{\pi}{2}k$ for $k \in \mathbb{Z}$)
16. $\theta = 2\pi k$, $\theta = \pi + 2\pi k$, $\theta = \frac{3\pi}{2} + 2\pi k$, $\theta = \frac{\pi}{6} + 2\pi k$, or $\theta = \frac{5\pi}{6} + 2\pi k$ for integer values of k
    (this can be written as $\theta = \pi k$ or $\theta = \frac{3\pi}{2} + \frac{2\pi}{3}k$ for $k \in \mathbb{Z}$. Although writing the solutions like this is unnecessary, I think it is a worthwhile exercise for you to try to figure out why this is equivalent to first way the answer was written)