Equations with Trig Functions

Pre/Calculus 11, Veritas Prep.

Using what you know about algebra (factoring, the quadratic formula, etc., etc.), and what you know about trigonometry (the unit circle, special right triangles, Pythagorean and other identities, etc.), solve the following equations for θ. That is, find all values of θ that make the equation true. (You may not be able to solve each equation exactly and might have to write some of your answers using an inverse trigonometric function.)

1. $\sin(\theta) = 1/2$
2. $\cos(\theta) = 1/\sqrt{2}$
3. $\tan(\theta) = (\sqrt{3}+1)/(\sqrt{3}-1)$
4. $\cos^2(\theta) = 3/4$
5. $\cos^2(\theta) = 1/2$
6. $\cos^2(\theta) = 0$
7. $\sin^2(\theta) = 1/4$
8. $\sin^2(\theta) = 1/2$
9. $\sin^2(\theta) = 1$
10. $\sin^2(\theta) - 1/4 = 0$
11. $\sin^2(\theta) - \frac{4-2\sqrt{2}}{8} = 0$
12. $\cos^2(\theta) - 1 = 0$
13. $\tan^2(\theta) - \frac{4+2\sqrt{3}}{4-2\sqrt{3}} = 0$
14. $\sin^2(\theta) - 5\sin(\theta) - \frac{1}{\sqrt{2}}\sin(\theta) + \frac{5}{\sqrt{2}} = 0$
15. $\sin^2(\theta) + \frac{3}{2}\sin\theta - 1 = 0$
16. $\sin(\theta)\cos(\theta) + \cos(\theta) - \frac{1}{\sqrt{2}}\sin(\theta) + \frac{1}{\sqrt{2}} = 0$
17. $2\cos^2(\theta) + \sin\theta + 1 = 0$
18. $\sin(2\theta) = \sqrt{2}/2$
19. $\cos(5\theta) = (\sqrt{3}+1)/(2\sqrt{2})$
20. $\tan(15\theta) = 0$
21. $\tan(\theta)\cos^2(\theta) = \tan(\theta)$
22. $3\sin^2(\theta) - 8\sin(\theta) = 3$
23. $5\cos^2(\theta) + 6\cos(\theta) = 0$
24. $2\tan^2(\theta) + 5\tan(\theta) + 3 = 0$
25. $3\sin^2(\theta) + 2\sin(\theta) = 5$
26. $\frac{\cos(\theta)}{\tan(\theta)} = \cos(\theta)$
27. $\tan(\theta)\cos(\theta) = \cos(\theta)$
28. $\cos(\theta) \cdot \frac{1}{\sin(\theta)} = 2\cos(\theta)$
29. $\tan(\theta) \cdot \frac{1}{\cos(\theta)} + 3\tan(\theta) = 0$
30. $4\sin(\theta)\tan(\theta) - 3\tan(\theta) + 20\sin(\theta) - 15 = 0$
31. $25\sin(\theta)\cos(\theta) = 5\sin(\theta) + 20\cos(\theta) = 4$
32. $\sin^2(\theta) + 2\sin(\theta) - 2 = 0$
33. $\cos^2(\theta) + 5\cos(\theta) = 1$
34. $\tan^2(\theta) + 1 = 3\tan(\theta)$
35. $4\cos^2(\theta) - 2\cos(\theta) = 1$
36. $2\tan^2(\theta) - 1 = 3\tan(\theta)$
37. $6\sin^2(\theta) + 4\sin(\theta) = 1$
38. $\frac{1}{\cos^2(\theta)} - 2\tan^2(\theta) = 0$
39. $9 - 12\sin(\theta) = 4\cos^2(\theta)$
40. $\frac{1}{\cos^2(\theta)} + \tan(\theta) = 3$
41. $\cos^2(\theta) - \sin^2(\theta) + \sin(\theta) = 0$
42. $2\tan^2(\theta) + \tan(\theta) = 5 - \frac{1}{\cos^2(\theta)}$
43. $\cos(\theta) = \sin(\theta)$
44. $\cos^2(\theta) = \sin^2(\theta)$
45. $\sin(\theta)\cos(\theta) - \frac{1}{\sqrt{2}}\cos(\theta) + \frac{\sqrt{3}}{2}\sin(\theta) - \frac{\sqrt{3}}{2\sqrt{2}} = 0$
46. $\tan(\theta)\sin(\theta) - \tan(\theta) + \sin(\theta) - 1 = 0$
47. $\cos^2(\theta) - \cos(\theta) - \frac{1}{\sqrt{2}}\cos(\theta) + \frac{1}{\sqrt{2}} = 0$