Algebra/Trig Review for Calculus

Solve the following equations. Also state the domain and range of each corresponding function. Give exact answers when possible.

1. $3x^2 + 2x - 1 = 0$

2. $12t^3 + 12t^2 - 12t = 0$

3. $\dfrac{\left(r^2+1\right) - 2r^2}{(r^2+1)^2} = 0$

4. $\dfrac{x^2 + x + 1 - (x+1)(2x+1)}{\left(x^2+x+1\right)^2} = 0$

5. $\dfrac{(x-4)(14x-16)}{5x^{\frac{1}{5}}} = 0$

6. $\dfrac{1}{3}\left(x^2 - x\right)^{-\frac{2}{3}}(2x-1) = 0$

7. $2\sin(2\theta)\cos(2\theta)2 = 0$

8. $x\left(\dfrac{1}{x}\right) + \ln x = 0$

9. $x\left(2e^{2x}\right) + e^{2x} = 0$

10. $\dfrac{-x}{\sqrt{9-x^2}} = 0$

11. $2x - \dfrac{2}{x^2} = 0$

12. $\dfrac{\left(x^2+4\right) - 2x^2}{\left(x^2+4\right)2} = 0$

13. $\cos x - \sin x = 0$

14. $1 + 2\sin x = 0$

15. $x\left(e^{-x}\right) + e^{-x} = 0$

16. $\dfrac{x\left(\dfrac{1}{x}\right) - \ln x}{x^2} = 0$

17. $e^{x^3 - x}(3x^2 - 1) = 0$

18. $x\dfrac{1-2x}{2\sqrt{x-x^2}} + \sqrt{x-x^2} = 0$

19. $\dfrac{(2+\sin x)(-\sin x) - (\cos x)(\cos x)}{(2+\sin x)^2} = 0$

20. $8 - 8x^7 = 0$

21. $1 - 2\cos x = 0$

22. $2\sin x = 0$

23. $\dfrac{(1+x)^2 - 2x(1+x)}{\left[(1+x)^2\right]^2} = 0$

24. $\dfrac{(1+x)^3(-1) - 3(1-x)(1+x)^2}{\left[(1+x)^3\right]^2} = 0$

25. $xe^x + e^x = 0$

26. $e^x + (x+1)e^x = 0$

27. $x^2e^x + 2xe^x = 0$

28. $\left(x^2 + 2x\right)e^x + e^x(2x+2) = 0$

29. $\dfrac{\sqrt{x}\left(\dfrac{1}{x}\right) - \ln x\left(\dfrac{1}{2}x^{-\frac{1}{2}}\right)}{x} = 0$

30. $\dfrac{2x^{\frac{3}{2}}\left(-\dfrac{1}{x}\right)-(2-\ln x)\left(3x^{\frac{1}{2}}\right)}{\left(2x^{\frac{3}{2}}\right)^2}=0$

31. $x\left(\dfrac{1}{x}\right)+\ln x=0$

32. $-\dfrac{1}{2}\left(-\dfrac{1}{2}\right)(1-x)^{-\frac{3}{2}}(-1)=0$

33. $x^4\cdot 3(x-1)^2+(x-1)^3\cdot 4x^3=0$

34. $24x^2+4x^3=0$

35. $15x^4-15x^2=0$

36. $60x^3-30x=0$

37. $1-\dfrac{1}{x^{\frac{2}{3}}}=0$

38. $\dfrac{2}{3}x^{-\frac{5}{3}}=0$

39. $x\cdot\dfrac{1}{2}(5-x)^{-\frac{1}{2}}(-1)+(5-x)^{\frac{1}{2}}=0$

40. $2-\csc^2 x=0$

41. $-2\csc x(-\csc x\cot x)=0$

42. $-2\sin x+2\sin x\cos x=0$

43. $-2\cos x+2\cos 2x=0$

44. $\dfrac{2x}{1+x^2}=0$

45. $\dfrac{\left(1+x^2\right)(2)-2x(2x)}{\left(1+x^2\right)^2}=0$

46. $\dfrac{\left(1-x^2\right)(2x)-\left(1-x^2\right)(-2x)}{\left(1-x^2\right)^2}=0$

47. $\dfrac{\left(1-x^2\right)^2\cdot 4-4x\cdot 2\left(1-x^2\right)(-2x)}{\left[\left(1-x^2\right)^2\right]^2}=0$

48. $\dfrac{(x-1)^2(1)-x(2)(x-1)}{\left[(x-1)^2\right]^2}=0$

49. $-\cos x\left(e^{\cos x}\right)-\sin x\left(e^{\cos x}\right)(-\sin x)=0$

50. $x^2(x-1)^2(7x-4)+x^3\cdot 2(x-1)(7x-4)+x^3(x-1)^2\cdot 7=0$

51. $\dfrac{2(5-x)^{\frac{1}{2}}(-3)-(10-3x)\cdot 2\left(\dfrac{1}{2}\right)(5-x)^{-\frac{1}{2}}(-1)}{\left(2\sqrt{5-x}\right)^2}=0$