1. $8^{x+3} - 14 = 18$

$8^{x+3} = 32$

$(2^3)^{x+3} = 2^5$

$3x + 9 = 5$

$3x = -4$

$\boxed{x = -\frac{4}{3}}$

2. $\frac{-2\log_6(3x+12)}{-2} = \frac{-8}{-2}$

$\log_6(3x+12) = 4$

$6^{\log_6(3x+12)} = 6^4$

$3x + 12 = 1296$

$3x = 1284$

$\boxed{x = 428}$ ✓ pos. ans.

3. $e^{3x-5} + 7 = 15$

$e^{3x-5} = 8$

$\ln e^{3x-5} = \ln 8$

$3x - 5 = \ln 8$

$3x = \ln 8 + 5$

$\boxed{x = \frac{\ln 8 + 5}{3}}$

4. $\log_2(4x-6) = \log_2(7x-30)$

$4x - 6 = 7x - 30$

$-6 = 3x - 30$

$24 = 3x$

$\boxed{x = 8}$ ✓ pos ans.

5. $\frac{1}{4}(3^{2x}) = 11$

$3^{2x} = 44$

$\log_3 3^{2x} = \log_3 44$

$2x = \log_3 44$

$\boxed{x = \frac{1}{2}\log_3 44}$

6. $\log_6 2 + \log_6(x-5) = 2$

$\log_6[2(x-5)] = 2$

$\log_6(2x-10) = 2$

$2x - 10 = 6^2$

$2x - 10 = 36$

$2x = 46$

$\boxed{x = 23}$ ✓ pos ans

7. $16 = 7\ln(4x-3) - 12$

$28 = 7\ln(4x-3)$

$4 = \ln(4x-3)$

$e^4 = 4x - 3$

$e^4 + 3 = 4x$

$\boxed{x = \frac{e^4 + 3}{4}}$ ✓ pos ans

8. $343^{-2x+1} = 49^{x-9}$

$(7^3)^{-2x+1} = (7^2)^{x-9}$

$-6x + 3 = 2x - 18$

$3 = 8x - 18$

$21 = 8x$

$\boxed{x = \frac{21}{8}}$

9. $7^{3x} = 15$

$\log_7 7^{3x} = \log_7 15$

$3x = \log_7 15$

$x = \boxed{\frac{1}{3}\log_7 15}$

10. $14 - \log \frac{1}{2}x = 17$

$-\log \frac{1}{2}x = 3$

$\log \frac{1}{2}x = -3$

$\frac{1}{2}x = 10^{-3}$

$\frac{1}{2}x = \frac{1}{1000}$

$\boxed{x = \frac{1}{500}}$ ✓ pos ans

11. $\ln\left(\frac{3}{5}x + 8\right) = \ln(1 - x)$

$\frac{3}{5}x + 8 = 1 - x$

$\frac{8}{5}x = -7$

$\boxed{x = -\frac{35}{8}}$ ✓ pos ans

12. $\frac{1}{216} = 36^{x+2}$

$6^{-3} = (3^2)^{x+2}$

$-3 = 2x + 4$

$-7 = 2x$

$\boxed{x = -7/2}$

13. $3^4 \cdot 3^{-4x-4} = 27$

$3^{-4x-4+4} = 27$

$3^{-4x} = 27$

$3^{-4x} = 3^3$

$-4x = 3$

$\boxed{x = -\frac{3}{4}}$

14. $-10 + 2e^x = 29$

$2e^x = 39$

$e^x = 39/2$

$\boxed{x = \ln\left(\frac{39}{2}\right)}$

15. $4 \ln x = 5$

$\ln x = 5/4$

$\boxed{x = e^{5/4}}$ ✓ pos ans

16. $3^x + 12 = 8$

$3^x = -4$

$\boxed{\text{no solution}}$

17. $4e^{3x-5} - 14 = 6$

$4e^{3x-5} = 20$

$e^{3x-5} = 5$

$3x - 5 = \ln 5$

$3x = \ln 5 + 5$

$\boxed{x = \frac{\ln 5 + 5}{3}}$

18. $7^{3x} = 14^{x+5}$

$\log_{14} 7^{3x} = \log_{14} 14^{x+5}$

$3x \cdot \log_{14} 7 = x + 5$

$x(3\log_{14} 7) - x = 5$

$x(3\log_{14} 7 - 1) = 5$

$\boxed{x = \frac{5}{3\log_{14} 7 - 1}}$

19. $\log x + \log(x+21) = 2$

$\log[x(x+21)] = 2$

$\log(x^2+21x) = 2$

$x^2+21x = 10^2$

$x^2+21x = 100$

$x^2+21x-100 = 0$

$(x+25)(x-4) = 0$

$x = -25, 4$

$\boxed{x = 4}$

20. $4(25^{x-8}) - 247 = 253$

$4(25^{x-8}) = 500$

$25^{x-8} = 125$

$(5^2)^{x-8} = 5^3$

$2x-16 = 3$

$2x = 19$

$\boxed{x = \frac{19}{2}}$

21. $\ln(4x-12) + 5 = 7$

$\ln(4x-12) = 2$

$4x-12 = e^2$

$4x = e^2+12$

$\boxed{x = \frac{e^2+12}{4}}$

22. $\log_4(3x+14) = \log_4(5x+26)$

$3x+14 = 5x+26$

$14 = 2x+26$

$-12 = 2x$

$x = -6$ pos ans?

$\boxed{\text{NO SOLUTION}}$

23. $625^{x-2} = 125^{2x+4}$

$(5^4)^{x-2} = (5^3)^{2x+4}$

$4x - 8 = 6x + 12$

$-8 = 2x + 12$

$-20 = 2x$

$\boxed{x = -10}$

24. $\ln(x-4) + \ln(x) = 3$

$\ln(x^2 - 4x) = 3$

$x^2 - 4x = e^3$

$x^2 - 4x - e^3 = 0$

$\frac{4 \pm \sqrt{16 + 4e^3}}{2} = \frac{4 \pm \sqrt{4(4+e^3)}}{2}$

$\frac{4 \pm 2\sqrt{4+e^3}}{2}$

$\boxed{x = 2 + \sqrt{4+e^3}}$, ~~$2 - \sqrt{4+e^3}$~~