

Solve the equation.

1. $10^{x-3} = 100^{4x-5}$
 $10^{x-3} = 10^2(4x-5)$ $x = +1$
 $x-3 = 8x-10 \quad -7x = -7$

2. $3^{x-7} = 27^{2x}$
 $3^{x-7} = 3^{3(2x)}$ $x = -7/5$
 $x-7 = 6x$
 $-7 = 5x$

3. $8^{5x} = 16^{3x+4}$
 $2^{3(5x)} = 2^{4(3x+4)}$
 $15x = 12x + 16$
 $3x = 16$ $x = 16/3$

4. $e^{-x} = 6$
 $\ln e^{-x} = \ln 6$
 $-\frac{1}{1}x = \frac{\ln 6}{-1}$
 $x = -\ln 6 \approx -1.79$ $x \approx -1.79$

5. $.25^x - .5 = 2$
 $.25^x = 2.5$
 $\ln .25^x = \ln 2.5$
 $x \frac{\ln .25}{\ln .25} = \frac{\ln 2.5}{\ln .25}$ $x \approx -0.66$

6. $7^{2x} + 3 = 8$
 $7^{2x} = 5$
 $\log 7^{2x} = \log 5$
 $2x \frac{\log 7}{\log 7} = \frac{\log 5}{\log 7}$
 $2x = 0.027$ $x \approx 0.41$

7. $10^{-12x} + 6 = 100$
 $10^{-12x} = 94$
 $\ln 10^{-12x} = \ln 94$
 $-12x \frac{\ln 10}{\ln 10} = \frac{\ln 94}{\ln 10}$
 $-12x = 1.973$ $x \approx -0.164$

8. $-16 + 0.2(3)^x = 35$
 $0.2(3)^x = 51$
 $\frac{0.2(3)^x}{0.2} = \frac{51}{0.2}$
 $3^x = 255$
 $\log 3^x = \log 255$
 $x \frac{\log 3}{\log 3} = \frac{\log 255}{\log 3}$
 $x \approx 5.044$ $x \approx 5.044$

Solve the equation. Check for extraneous solutions.

9. $\ln(4x+1) = \ln(2x+5)$
 $4x+1 = 2x+5$
 $2x = 4$
 $x = 2$

10. $\log_2 x = -1$
 $2^{-1} = x$ $x = \frac{1}{2}$

11. $\frac{4 \log_3 x}{4} = \frac{28}{4}$
 $\log_3 x = 7$
 $3^7 = x$ $x = 2187$

12. $\frac{1}{-2} 2 \ln x = \frac{-4}{-1}$
 $-\frac{1}{2} \ln x = -2$
 $\ln x = \frac{5}{2}$
 $e^{\ln x} = e^{5/2}$ $x = 12.182$

13. $\ln x + \ln(x-2) = 1$
 SKIP

14. $\log_8(11-6x) = \log_8(1-x)$
 $11-6x = 1-x$
 $\frac{5x}{5} = \frac{10}{5}$
 $x = 2$ \emptyset

15. $\frac{15}{-5} + 2 \log_2 x = \frac{31}{-5}$
 $2 \log_2 x = \frac{16}{2}$
 $\log_2 x = 8$
 $2^8 = x$ $x = 256$

16. $\frac{6.5 \log_5 3x}{6.5} = \frac{20}{6.5}$
 $\log_5 3x = 3.077$
 $5^{3.077} = 3x$
 $3x = 141.49$ $x \approx 47.16$

- Answers: 1) 1 2) -7/5 3) 16/3 4) -1.79 5) -0.66 6) 0.41 7) -0.165 8) 5.04
 9) 2 10) 1/2 11) 2187 12) 12.18 13) $1 + \sqrt{1+e}$ 14) \emptyset 15) 256 16) 47.16