General Algebra II   Worksheet #7   Unit 12   Selected Solutions

Solve each of the following equations without using a calculator.

2. $25^{(3x + 1)} = 125$
$(5^2)^{(3x + 1)} = 5^3$
$5^{(6x + 2)} = 5^3$
$6x + 2 = 3$
$6x = 1$
$x = 1/6$

4. $8^{(2x - 5)} = 16$
$(2^3)^{(2x - 5)} = 2^4$
$2^{(6x - 15)} = 2^4$
$6x - 15 = 4$
$6x = 19$
$x = 19/6$

6. $\text{Log}_5\, x = -2$
$x = 5^{-2}$
$x = \dfrac{1}{5^2}$
$x = \dfrac{1}{25}$

9. $\text{Log}_9\, x = 1.5$
$x = 9^{1.5}$
$x = 9^{\frac{3}{2}} = \left(\sqrt{9}\right)^3 = 3^3$
$x = 27$

Solve each of the following equations. Express your solutions rounded to the nearest hundredth. (You will need a calculator for these.)

12. $3^{(2x - 1)} = 75$
$\text{Log}\, 3^{(2x - 1)} = \text{Log}\, 75$
$(2x - 1)\text{Log}\, 3 = \text{Log}\, 75$
$2x\text{Log}\, 3 - \text{Log}\, 3 = \text{Log}\, 75$
$2x\text{Log}\, 3 = \text{Log}\, 75 + \text{Log}\, 3$
$x = \dfrac{\text{Log}\, 75 + \text{Log}\, 3}{2\text{Log}\, 3} \approx 2.46$

14. $e^{(3x + 5)} = 80$
$\ln e^{(3x + 5)} = \ln 80$
$(3x + 5)\ln e = \ln 80$
$3x + 5 = \ln 80$
$3x = \ln 80 - 5$
$x = \dfrac{\ln 80 - 5}{3} \approx -0.21$

15. $\text{Log}_2\, x = 2.1$
$x = 2^{2.1} \approx 4.29$

17. $\ln x = 3.1$
$x = e^{3.1} \approx 22.20$