SOLVING LOG EQUATIONS DAY 1

NAME key Spr 17

SOLVE.

1. $\log_3 x^{-5} = 10$

$-5\log_3 X = 10$

$\log_3 X = -2$

$3^{-2} = X$

$X = \frac{1}{9}$

2. $3^{n+7} = 44$

$\log_3 44 = n+7$

$3.44452 = n+7$

$-3.555 = n$

3. $8 + \ln -5x = 6$

$\ln -5x = -2$

$e^{-2} = -5x$

$\frac{e^{-2}}{-5} = x$

$x = -.0271$

4. $1 + \ln 9p = 2$

$\ln 9p = 1$

$e^1 = 9p$

$\frac{e^1}{9} = p$

$p = .302$

5. $7\log_4(x+2) = 0$

$\log_4(x+2) = 0$

$4^0 = x+2$

$1 = x+2$

$x = -1$

6. $e^{6x} - 5 = 10$

$e^{6x} = 15$

$\ln 15 = 6x$

$\frac{\ln 15}{6} = x$

$x = .45134$

7. $5(2)^{n+9} = 92$

$2^{n+9} = 92/5$

$\log_2 \frac{92}{5} = n+9$

$4.2016 = n+9$

$n = -4.798$

8. $\log_7 -5k - 7 = -4$

$\log_7 -5k = 3$

$7^3 = -5k$

$343 = -5k$

$k = -68.6$

9. $e^{x-8} - 6 = 87.6$

$e^{x-8} = 93.6$

$\ln 93.6 = x-8$

$4.53903 = x-8$

$x = 12.53903$

10. $\log_4(-19n+1) = \log_4(n^2+91)$

$-19n+1 = n^2+91$

$0 = n^2+19n+90$

$0 = (n+10)(n+9)$

$n=-10 \quad n=-9$

11. $\log \sqrt[3]{(9x-8)^2} = \frac{4}{3}$

$\log(9x-8)^{2/3} = 4/3$

$(10^{4/3} = (9x-8)^{2/3})^3$

$\sqrt{10^4} = \sqrt{(9x-8)^2}$

$10^2 = 9x-8$

$100 = 9x-8$

$108 = 9x$

$x=12$

*-12 won't work

12. $3^{2x+3} = 4^{x-2}$

$\log_3 4^{x-2} = 2x+3$

$(x-2)\log_3 4 = 2x+3$

$(x-2)(1.2619) = 2x+3$

$1.2619x - 2.528 = 2x+3$

$-5.528 = .7381x$

$x = -7.4895$

13. $4^{x+1} = 5^{2x-3}$

$\log_4 5^{2x-3} = x+1$

$(x-3)\log_4 5 = x+1$

$(x-3)(1.16096) = x+1$

$1.32192x - 3.48288 = x+1$

$.32192x = 4.48288$

$x = 3.3912$

14. $\log_3(x^2-5)^4 = 4$

$4\log_3(x^2-5) = 4$

$\log_3(x^2-5) = 1$

$3^1 = x^2-5$

$8 = x^2$

$x = \pm 2.828$

15. $5e^{3x+1} - 3 = 10$

$5e^{3x+1} = 13$

$e^{3x+1} = 13/5$

$\ln 13/5 = 3x+1$

$.955511 = 3x+1$

$-.0445 = 3x$

$x = -.0148$

16. $\log(\sqrt[4]{10-5x})^3 = 3$

$3\log(10-5x)^{1/4} = 3$

$\log(10-5x)^{1/4} = 1$

$(10^1 = (10-5x)^{1/4})^4$

$10,000 = 10-5x$

$9990 = -5x$

$x = -1998$

17. $(\frac{1}{16})^{x-1} = 4^{3x+3}$

$(4^{-2})^{x-1} = 4^{3x+3}$

$-2x+2 = 3x+3$

$-1 = 5x$

$x = -1/5$

18. $\log(n^2+2n) = \log(81+2n)$

$n^2+2n = 81+2n$

$n^2 = 81$

$n = \pm 9$