Solving Logs + Exponentials

1.) $2^{3-2n} = 2^2$

One base 2 set = to one base 2

$3-2n=2$

$-2n=-1$

$n=\frac{1}{2}$

2.) $2^{2v+3} \cdot 2^{3v} = 2^3$

need one base 2

rules of Exponents

$2^{5v+3} = 2^3$

$5v+3=3$

$5v=0$

$v=0$

3.) $16^{2a} \cdot 16^{a} = 2^2$

$16^{3a} = 2^2$

need like bases

16 is 2^4

$2^{4(3a)} = 2^2$

$2^{12a} = 2^2$

$12a=2$

$a=\frac{1}{6}$

4.) $64^{2x+2} = \frac{1}{4}$

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

$6x+6=-1$

$6x=-7$

$x=-7/6$

5.) $9^{-10n} - 4 = 16$

no way to get like bases

So Isolate the Exponential

$9^{-10n} = 20$ *Change to Log

$\log_9(20) = -10n$ *Calculator

$1.3634 = -10n$

$-0.1363 = n$

6.) $8^{b+8} + 1 = 16$

$8^{b+8} = 15$ Isolate

$\log_8(15) = b+8$ Change to log

Calculator

$1.3023 = b+8$

$-6.6977 = b$

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7.) $8^{-10n-4} - 7 = 35$

$8^{-10n-4} = 42$ Isolate

$\log_8(42) = -10n-4$ log calculator

$1.7974 = -10n-4$

$-0.5797 = n$

8.) $19^{1-4m} - 3 = 59$

$19^{1-4m} = 62$

$\log_{19} 62 = 1-4m$

$1.4017 = 1-4m$

$-0.1004 = m$

9.) $\log 29 = \log(3x-1)$

$1\log = 1\log$

$29 = 3x-1$

$30 = 3x$

$10 = x$

10.) $\log_{19}(2k-10) = \log_{19}(k-5)$

$1\log = 1\log$

$2k-10 = k-5$

$k = 5$ No Solution DNE

Check would be taking the $\log(0)$ = DNE

11.) $9 + \log_8 4b = 13$

$\log_8 4b = 4$ *only 1 log *use Exponentials

$8^4 = 4b$

$b = 1024$

12.) $\log_8(x+3) = 7$

$\log_8(x+3) = 1$

$8^1 = x+3$

$5 = x$

13.) $\ln 4 - \ln(-x) = 1$ condense

$\ln\left(\frac{4}{-x}\right) = 1$

$e^1 = 4/-x$ $x = -4/e$ or -1.4715

14.) $\log_6 3 - \log_6(x-1) = 1$

$\log_6 \frac{3}{x-1} = 1$

$6^1 = 3/x-1$

$6x-6 = 3$

$6x = 9$

$x = 3/2$

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15.) $\log_2(x+4) - \log_2 7 = 1$

$\log_2\left(\frac{x+4}{7}\right) = 1$

$2^1 = \frac{x+4}{7}$

$14 = x+4$

$x = 10$

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

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

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

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

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

$x = -25$ $x = 4$

Cannot take log of a neg.

$\log(-25) + \log(-25+21) = 2$

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