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$\log a = p$
logarithmic form

$b^p = a$
exponential form

Date _____
Algebra II

Converting Between Exponential and Logarithmic Form

Write each of the following in exponential form:

1. $\log_4 256 = 4$

$$4^4 = 256$$

3. $\log_{12} \frac{1}{144} = -2$

$$12^{-2} = \frac{1}{144}$$

5. $\log 100 = 2$

$$10^2 = 100$$

7. $\log_{x+2}(x^2 - 5x + 4) = 4$

$$(x+2)^4 = x^2 - 5x + 4$$

9. $\log(x^3 - 7x) = 4$

$$10^4 = x^3 - 7x$$

11. $\log_2 \left(\frac{x^2 - 4x + 1}{x - 7} \right) = x + 2$

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

2. $\log_x k = 5$

$$x^5 = k$$

4. $\log_2 \frac{1}{q} = p$

$$2^p = \frac{1}{q}$$

6. $\ln 50 = x$

$$e^x = 50$$

8. $\log_3(x^2 + 4) = x + 7$

$$3^{x+7} = x^2 + 4$$

10. $\log_{x-9} 2 = x + 1$

$$x - 9^{x+1} = 2$$

12. $\log_x \left(\frac{x^2 + x - 3}{x + 1} \right) = 6$

$$x^6 = \frac{x^2 + x - 3}{x + 1}$$

Write each of the following in logarithmic form:

$$13. 9^2 = 81$$

$$\log_9 81 = 2$$

$$14. x^4 = q$$

$$\log_x q = 4$$

$$15. 6^{-3} = \frac{1}{216}$$

$$\log_6 \frac{1}{216} = -3$$

$$16. 17^t = d$$

$$\log_{17} d = t$$

$$17. e^x = 12$$

$$\ln 12 = x$$

$$\ln 12 = x$$

$$18. 10^{-2} = \frac{1}{100}$$

$$\log_{10} \frac{1}{100} = -2$$

$$\log_{10} \frac{1}{100} = -2$$

$$19. (x^2 + 5x)^3 = x + 2$$

$$\log_{x+5x} (x+2) = 3$$

$$20. 6^{2x+7} = x^2 - 7$$

$$\log_6 (x^2 - 7) = 2x + 7$$

$$21. (x+5)^{x^2+8x-1} = 3$$

$$\log_{x+5} 3 = x^2 + 8x - 1$$

$$22. (x^2 + 1)^4 = x + 11$$

$$\log_{x^2+1} (x+11) = 4$$

$$23. (x+2)^2 = \frac{x^2 - 6x + 2}{x+1}$$

$$\log_{x+2} \left(\frac{x^2 - 6x + 2}{x+1} \right) = 2$$

$$24. 10^4 = \frac{x+2}{x^2+2x-4}$$

$$\log_{10} \left(\frac{x+2}{x^2+2x-4} \right) = 4$$

$$\log \left(\frac{x+2}{x^2+2x-4} \right) = 4$$