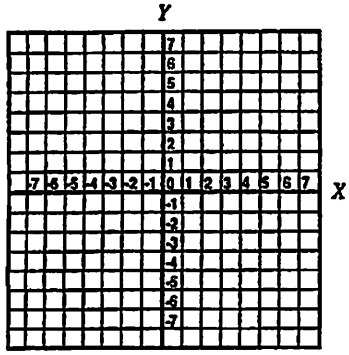
#2

Pre-Calculus Chapter 3 Review & Study Guide Name _____

3.1 Exponential & Log Graphs Graph and list domain, range, and asymptotes for each.

1) $y = 3^x + 1$.



D:
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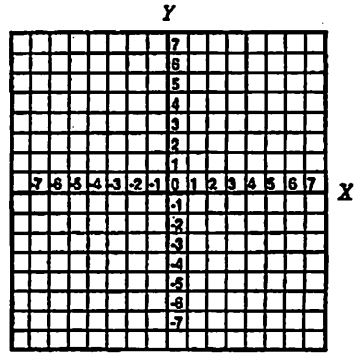
2) $y = 2^{-x} - 2$



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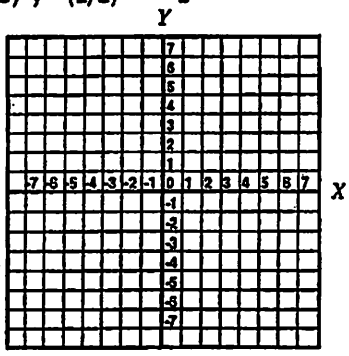
3) $y = (1/2)^{-x+2} - 1$



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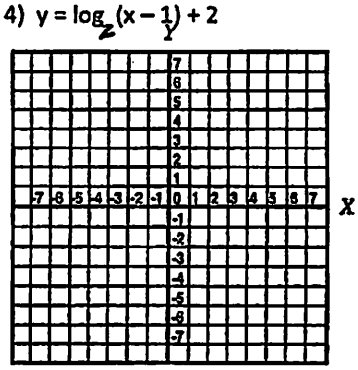
4) $y = \log_2(x - 1) + 2$



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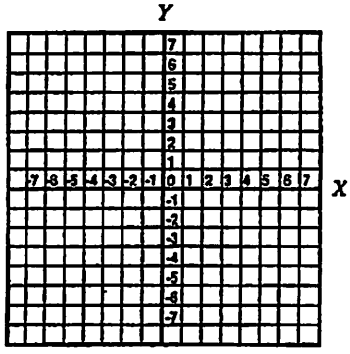
5) $y = -\ln(x + 2)$



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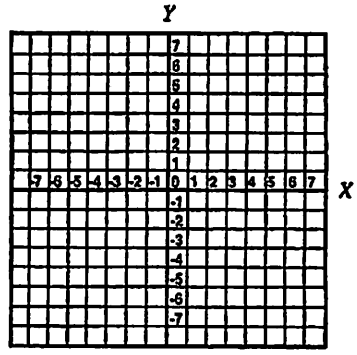
6) $y = -\log(-x - 3) + 3$



D:
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V.A.

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3.2 Solving Exponential Equations

TRY to get the same base. If you can't, then use _____ or _____.

1) $3^x = 1/27$ 2) $4^x = 2$ 3) $7^{2x} = \sqrt{7}$

4) $8^{2x-1} = 2^{x+3}$ 5) $9^{4x-1} = 3$ 6) $5^{x^2} = 50$

7) $7^{2x-1} = 14$ 8) $8^{2x-9} = 6^{x+3}$ 9) $3e^{2x+3} = 5$

Use change of base when solving as well. Change of BASE log x = _____

10) $3^x = 7$ 11) $6^{x+1} = 9$ 12) $7^{2x-3} = 21$ 13) $4^{x+2} + 1 = 19$

PROPERTIES of LOGS: 1) logA + logB = 2) logA – logB = 3) BlogA =

Condense:

1) Log2 + log4 + log5 2) logx – log(x-2) + log(x+5) 3) 2logx + 3logy

4) lne + ln4 – ln(y-3) + ln(y+3) 5) 2lne – ln(x+ 7) + ln(18) –ln(11)

Expand:

6) $\log(9x^3 y/w)$ 7) $\log(100xyw/(y-9))^3$

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LOG EQUATIONS: Isolate the log and then use left to _____ OR try and get the equation in the form log = log so you can _____ the logs.

1) $\log x = 2$ 2) $\ln x = 3$ 3) $\log_4 x = 2$ 4) $\log_x 4 = 2$ 5) $\log(2x-3) = 2$

6) $\log_2 (4x-1) = \log_2 (1)$ 7) $\log_7 (x) + \log_7 (x+2) = 1$ 8) $\log(x-4) - \log(x+3) = \log 9$

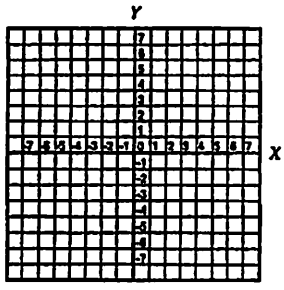
Remember, you must always check your solutions to a log equation in the original since the domain of log(x) is _____.

Find the domain and range of each log function.

1) $\text{Log}(6-x) = f(x)$ 2) $f(x) = 2\log(2x+3)$ 3) $f(x) = \log(x-7)^2$

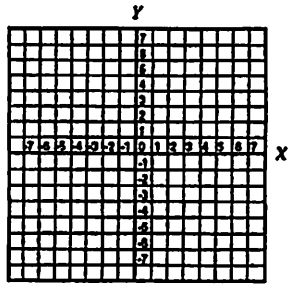
Know how to find and graph an inverse function. Switch x and y and solve for y. In order to graph an inverse function, _____.

1) Graph $y = 2^x - 1$ and the inverse.



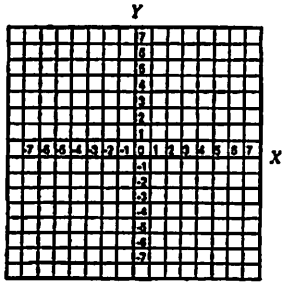
inverse
y=

2) Graph $y = \log(x-1) + 2$ and the inverse.



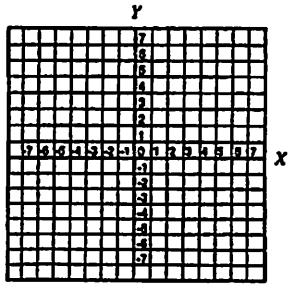
inverse
y=

3) Graph $y = -\ln(-x) + 2$ and the inverse.



inverse
y=

4) Graph $y = 3^{x-1} + 2$ and the inverse.



inverse
y=

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Evaluate logs without the use of a calculator.

1) $\log_2 8$ 2) $\log_3 1$ 3) $\log_4 \frac{1}{4}$ 4) $\log_4(-4)$ 5) $\log .000001$

6) $\ln e^7$ 7) $\log_7 7^4$ 8) $\log 10^{2x}$ 9) $e^{\ln 1.8}$ 10) $\log_2 1 + \log 100$

11) $\log_8 2$ 12) $\log_9 9^{x+1}$ 13) $10^{2\log x}$ 14) $\log_5 \sqrt[3]{5}$ 15) $\ln(1/e^7) + \log_7(\cos 0)$

Exponential Growth and Decay: Be able to solve problems involving exponential models as well as logistic growth models. Also, be able to use Newton's Law of Cooling.

Exp. Model $A = A_0 e^{kt}$ Logistic Model $f(x) = a/(b + ce^x)$

Newton's Law of Cooling $(A - t_r) = (A_0 - t_r)e^{kt}$

1) Kylee deposits $9,800 into an account earing 4.35% annual interest. How long will it take her money to double? To triple? When will she have $50,000?

2) A fossil contains 35% of its original amount of carbon-14. How old is the fossil? Use 5715 years as the half-life.

3) A certain city follows the exponential law. In 1999, there were 34,456 people and in 2011, there were 45,555 people. How many people should we expect in the year 2020?

4) Marilynn wants to have $400,000 in the bank by the time she is 30. How much should she deposit in order to reach this goal in 12 years at 5.567% annual interest?

Challenge type problems:

① $2^{2x} - 3 \cdot 2^x + 2 = 0$ ② $e^{2x} - 5e^x + 4 = 0$