Algebra 2 – Unit 12 – 2021 Name:_____

Day 1 – Evaluating Logarithms Period:_____Date:_____

Rewrite the equation in exponential form.

1. $\log_4 16 = 2$ **2.** $\log_7 343 = 3$ **3.** $\log_6 \frac{1}{36} = -2$ **4.** $\log 1000 = 3$

Evaluate the following logarithms without using a calculator.

5. $\log_3 81$ **6.** $\log_4 256$ **7.** $\log_5 1$ **8.** $\log_8 \frac{1}{64}$ **9.** $\log_{81} 3$

10. $\log_{81} \frac{1}{3}$ **11.** $\log_8 2$ **12.** $\log_{1/4} 16$ **13.** $\log_{16} 0.25$ **14.** $\log_5 125$

Use the inverse property of logarithms to simplify the following expressions.

15. $\log_7 49^{3x}$ **16.** $10^{\log \pi}$ **17.** $\ln e^{x-3}$ **18.** $\log 10^{-5}$

Use your calculator to evaluate the following logarithms.

19. $\log 52$ **20.** $\ln 0$

Algebra 2 – Unit 12 – 2021
Day 2 – Graphing Logarithms

Name:_____
Period:_____Date:_____

Find the inverse of the following functions.

1. $y = \log_3 x$

2. $y = \log_{0.5} x$

3. $y = e^{3x}$

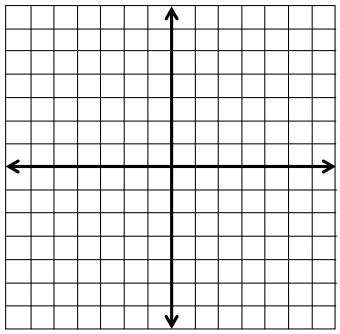
4. $y = \log(x+2)$

5. $y = \ln(x-4) - 3$

6. $y = 2^x - 3$

Graph the following logarithmic functions.

7. $y = \log_3 x$



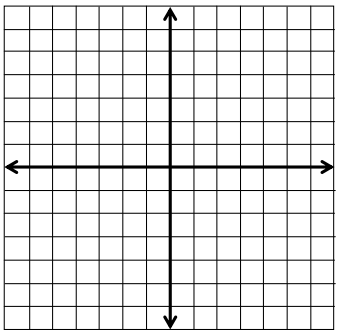
Domain:

Range:

Asym:

(_____, **−1**) (, _____, **0**) (_____, **1**)

8. $f(x) = \log_{1/2} x$



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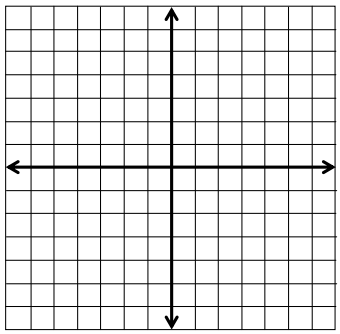
(_____, **−1**) (, _____, **0**) (_____, **1**)

9. $y = \log_2(x-1)$



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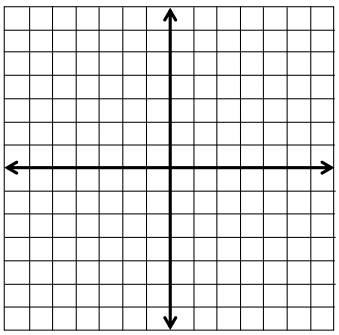
(_____, **−1**) (, _____, **0**) (_____, **1**)

10. $f(x) = \log_4 x - 3$



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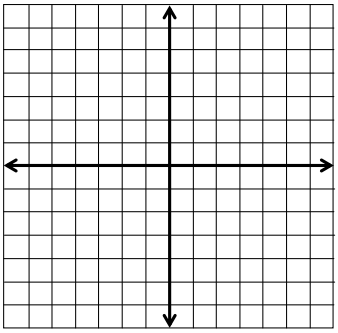
Asym:

(_____, **−1**) (, _____, **0**) (_____, **1**)

11. $y = \log_{1/3}(x+3)+2$



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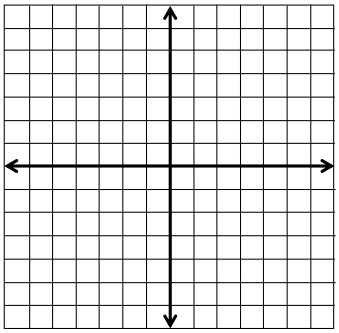
Asym:

(_____, **−1**) (, _____, **0**) (_____, **1**)

12. $f(x) = \log_2(x-2)+1$



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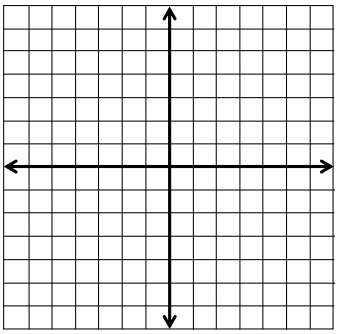
(_____, **−1**) (, _____, **0**) (_____, **1**)

13. $y = \log_4(x+3)$



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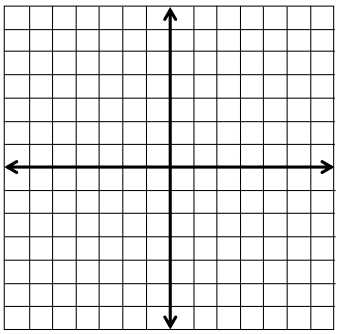
(_____, **−1**) (, _____, **0**) (_____, **1**)

14. $f(x) = \log_{0.5} x+2$



Domain:

Range:

Asym:

(_____, **−1**) (, _____, **0**) (_____, **1**)

Algebra 2 – Unit 12 – 2021 Name:_____
Day 3 – Properties of Logs (Expanding) Period:_____Date:_____

Match the expression with the logarithm that has the same value.

1. $\ln 6 - \ln 2$
2. $2\ln 6$
3. $6\ln 2$
4. $\ln 6 + \ln 2$

A. $\ln 64$
B. $\ln 3$
C. $\ln 12$
D. $\ln 36$

Evaluate the following logarithms if: $\log 4 \approx 0.602$ and $\log 12 \approx 1.079$

5. $\log 48$ **6.** $\log 64$ **7.** $\log 3$

Expand the following logarithmic expressions.

9. $\ln 15x$ **10.** $\ln 3x^4$ **11.** $\log_2 \frac{2}{5}$ **12.** $\log_4 \frac{x}{3y}$

13. $\log_6 36x^2$ **14.** $\log 10x^3$ **15.** $\log_2 \sqrt{x}$ **16.** $\log_3 \sqrt{9x}$

17. $\ln \frac{6x^2}{y^4}$

Algebra 2 – Unit 12 – 2021 Name:_____
Day 4 – Properties of Logs (Condensing) Period:_____Date:_____

Condense the following logarithmic expressions.

1. $\log_4 7 - \log_4 10$ **2.** $\ln 12 - \ln 4$ **3.** $2\log x + \log 11$ **4.** $6\ln x + 4\ln y$

5. $5\log x - 4\log y$ **6.** $5\log_4 2 + 7\log_4 x + 4\log_4 y$ **7.** $\ln 40 + 2\ln\frac{1}{2} + \ln x$

8. $\log_5 4 + \frac{1}{3}\log_5 x$ **9.** $6\ln 2 - 4\ln y$ **10.** $2(\log_3 20 - \log_3 4) + 0.5\log_3 4$

Evaluate the following logarithmic expressions using the change of base formula.

11. $\log_4 7$ **12.** $\log_5 13$ **13.** $\ln 15$ **14.** $\log_4\left(\frac{1}{64}\right)$

15. $\log_3 81$ **16.** $\log_{1/2} 16$ **17.** $\log_\pi 1$ **18.** $\ln e^4$

Algebra 2 – Unit 12 – 2021 Name:_____
Day 5 – Solving Exponential Equations Period:_____Date:_____

<u>Solve the equation</u>

1. $5^{x-4} = 25^{x-6}$
2. $4^{2x-5} = 64^{3x}$
3. $36^{5x+2} = \left(\frac{1}{6}\right)^{11-x}$
4. $8^x = 20$
5. $e^{-x} = 5$
6. $7^{3x} = 18$
7. $11^{5x} = 33$
8. $7^{6x} = 12$
9. $4e^{-2x} = 17$
10. $10^{3x} + 4 = 9$
11. $-3e^{2x} + 16 = 5$
12. $0.5^x - 0.25 = 4$
13. $8^{x-1} = 32^{3x-2}$
14. $\frac{1}{3}(6)^{-4x} + 1 = 6$

Algebra 2 – Unit 12 – 2021 Name:_____
Day 6 – Solving Exponential Equations Period:_____Date:_____

<u>Solve the equation. Check for extraneous solutions.</u>

1. $\log_5(5x+9) = \log_5 6x$
2. $\ln(x+19) = \ln(7x-8)$
3. $\log(12x-11) = \log(3x+13)$
4. $\log_6(3x-10) = \log_6(14-5x)$
5. $\log_4 x = -1$
6. $\frac{1}{3}\log_5 12x = 2$
7. $\log_2(x-4) = 6$
8. $\log_4(-x) + \log_4(x+10) = 2$
9. $4\ln(-x) + 3 = 21$
10. $\log_6 3x + \log_6(x-1) = 3$
11. $3\log_8(2x+7) + 8 = 10$
12. $\log_3 10x = 5$