

Name:	Date:
Topic:	Class:

Main Ideas/Questions	Notes/Examples						
What is a LOGARITHM?	<p>A logarithm (log) is another way of writing exponents.</p> <div style="display: flex; align-items: center; justify-content: center;"> <div style="border: 1px solid black; border-radius: 15px; padding: 10px; margin: 5px;"> <p style="text-align: center;">Logarithmic Form</p> $\log_b a = x$ </div> <div style="margin: 0 20px;"> \rightarrow </div> <div style="border: 1px solid black; border-radius: 15px; padding: 10px; margin: 5px;"> <p style="text-align: center;">Exponential Form</p> </div> </div> <p style="text-align: center;"> Read as "log base b of a equals x." </p>						
Converting LOG \leftrightarrow EXP	<p>Directions: Write each equation in exponential form.</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; padding: 5px;">1. $\log_3 9 = 2$</td> <td style="width: 50%; padding: 5px;">2. $\log_6 216 = 3$</td> </tr> <tr> <td style="padding: 5px;">3. $\log_7 1 = 0$</td> <td style="padding: 5px;">4. $\log_2 16 = 4$</td> </tr> <tr> <td style="padding: 5px;">5. $\log_4 \frac{1}{16} = -2$</td> <td style="padding: 5px;">6. $\log_9 27 = \frac{3}{2}$</td> </tr> </table>	1. $\log_3 9 = 2$	2. $\log_6 216 = 3$	3. $\log_7 1 = 0$	4. $\log_2 16 = 4$	5. $\log_4 \frac{1}{16} = -2$	6. $\log_9 27 = \frac{3}{2}$
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	3. $\log_7 1 = 0$	4. $\log_2 16 = 4$					
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Converting EXP \leftrightarrow LOG	<p>Directions: Write each equation in logarithmic form.</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; padding: 5px;">7. $14^2 = 196$</td> <td style="width: 50%; padding: 5px;">8. $3^4 = 81$</td> </tr> <tr> <td style="padding: 5px;">9. $12^1 = 12$</td> <td style="padding: 5px;">10. $36^{\frac{1}{2}} = 6$</td> </tr> <tr> <td style="padding: 5px;">11. $2^{-3} = \frac{1}{8}$</td> <td style="padding: 5px;">12. $8^{\frac{4}{3}} = 16$</td> </tr> </table>	7. $14^2 = 196$	8. $3^4 = 81$	9. $12^1 = 12$	10. $36^{\frac{1}{2}} = 6$	11. $2^{-3} = \frac{1}{8}$	12. $8^{\frac{4}{3}} = 16$
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<p>COMMON LOGARITHM</p>	<p>A logarithm with base 10 is called a common logarithm and can be written without the base.</p> <div style="border: 1px solid black; border-radius: 10px; padding: 5px; display: inline-block;"> $\log_{10} x \rightarrow$ </div>	
<p>EVALUATING LOGARITHMS</p>	<p>Directions: Use your knowledge of exponents to evaluate the following logarithms.</p>	
	<p>13. $\log_7 49$</p>	<p>14. $\log_3 27$</p>
	<p>15. $\log 100$</p>	<p>16. $\log_{12} 1$</p>
	<p>17. $\log_2 64$</p>	<p>18. $\log_3 243$</p>
	<p>19. $\log_9 \frac{1}{81}$</p>	<p>20. $\log_{64} 4$</p>
<p>CHANGE OF BASE FORMULA</p> <div style="border: 1px solid black; border-radius: 10px; padding: 5px; margin-top: 20px;"> <p>Choose BASE 10 because there is a calculator button for it!</p> </div>	<p>Some logarithms are not as easy to evaluate as those above, and will require the change of base formula.</p> <div style="border: 1px solid black; border-radius: 10px; padding: 5px; display: inline-block; margin-left: 20px;"> $\log_b a =$ </div>	
	<p>Directions: Evaluate each log using the change of base formula.</p>	
	<p>21. $\log_{16} 64$</p>	<p>22. $\log_8 32$</p>
	<p>23. $\log_2 54$</p>	<p>24. $\log_{10} 294$</p>
<p>25. $\log_4 136$</p>	<p>26. $\log_6 \frac{1}{36}$</p>	

Name: _____ Unit 7: Exponential & Logarithmic Functions

Date: _____ Bell: _____ Homework 3: Intro to Logarithms

Directions: Write each equation in exponential form.

1. $\log_2 128 = 7$

2. $\log_8 64 = 2$

3. $\log_3 \frac{1}{27} = -3$

Directions: Write each equation in logarithmic form.

4. $4^4 = 256$

5. $8^3 = 512$

6. $27^{\frac{2}{3}} = 9$

Directions: Evaluate each logarithm. Use the change of base formula when necessary.

7. $\log_6 36$

8. $\log_2 32$

9. $\log_4 64$

10. $\log_3 81$

11. $\log_{100} 10$

12. $\log_7 \frac{1}{7}$

13. $\log_{18} 1$

14. $\log_2 \frac{1}{16}$

15. $\log 1000$

16. $\log_{16} 8$

17. $\log_{243} 27$

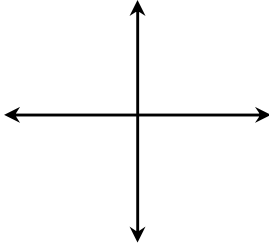
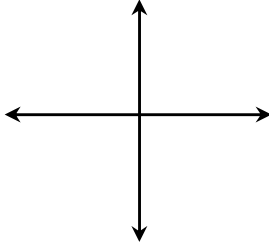
18. $\log_3 92$

19. $\log_7 35$

20. $\log_2 260$

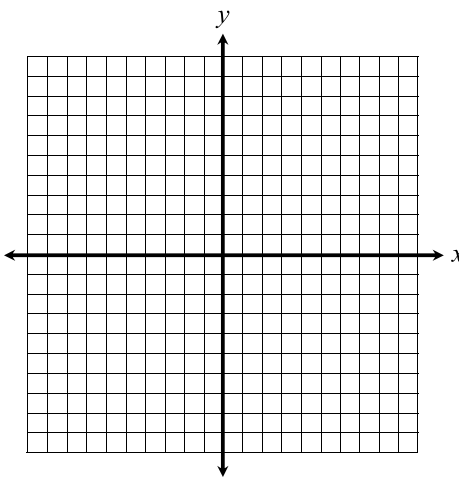
21. $\log_5 38$

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Main Ideas/Questions	Notes/Examples
<p>LOGARITHMIC <i>Parent Function</i></p> <div style="border: 1px solid black; width: 100px; height: 30px; margin: 10px auto;"></div>	<p>A logarithmic function is the inverse of an exponential function. Using your graphing calculator, sketch the following graphs:</p> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;"> <div style="border: 1px solid black; border-radius: 10px; padding: 5px; display: inline-block;">$f(x) = \log x$</div>  </div> <div style="text-align: center;"> <div style="border: 1px solid black; border-radius: 10px; padding: 5px; display: inline-block;">$f(x) = 10^x$</div>  </div> </div> <p>Because you can only graph base 10 logs on your calculator, you will need to use the inverse exponential function, then invert the values from the table to graph the logarithmic function.</p>

Directions: Graph each function and identify its key characteristics.

1. $f(x) = \log_2 x$



Domain: _____

Range: _____

End Behavior:

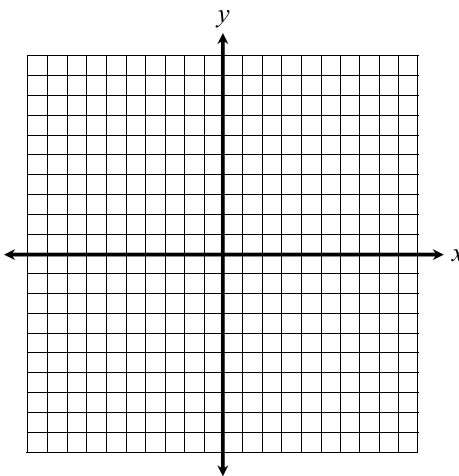
As $x \rightarrow$ _____, $f(x) \rightarrow \infty$

As $x \rightarrow$ _____, $f(x) \rightarrow -\infty$

x-intercept: _____

Asymptote: _____

2. $f(x) = \log_{\frac{1}{3}} x$



Domain: _____

Range: _____

End Behavior:

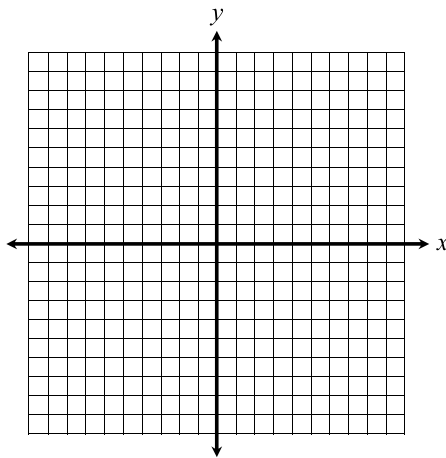
As $x \rightarrow$ _____, $f(x) \rightarrow \infty$

As $x \rightarrow$ _____, $f(x) \rightarrow -\infty$

x-intercept: _____

Asymptote: _____

3. $f(x) = \log_4(x-1)$



Domain: _____

Range: _____

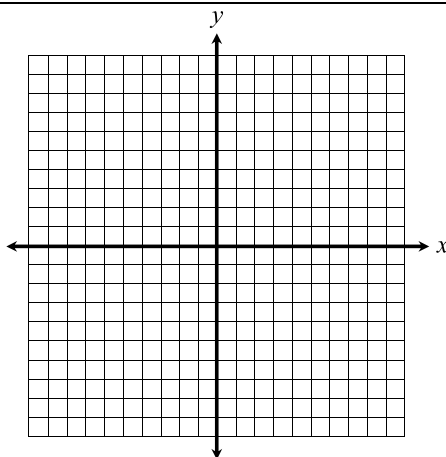
End Behavior:

As $x \rightarrow$ _____, $f(x) \rightarrow \infty$ As $x \rightarrow$ _____, $f(x) \rightarrow -\infty$

x-intercept: _____

Asymptote: _____

4. $f(x) = \log_3 x - 2$



Domain: _____

Range: _____

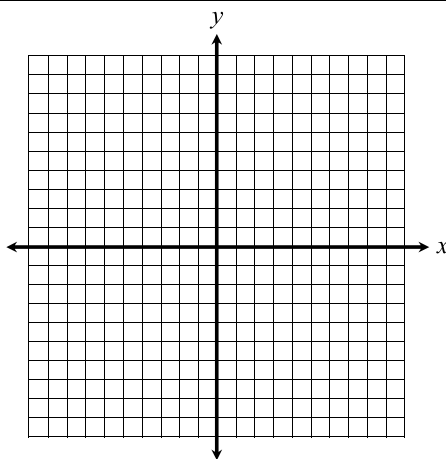
End Behavior:

As $x \rightarrow$ _____, $f(x) \rightarrow \infty$ As $x \rightarrow$ _____, $f(x) \rightarrow -\infty$

x-intercept: _____

Asymptote: _____

5. $f(x) = \log_{\frac{1}{2}}(x+9) + 4$



Domain: _____

Range: _____

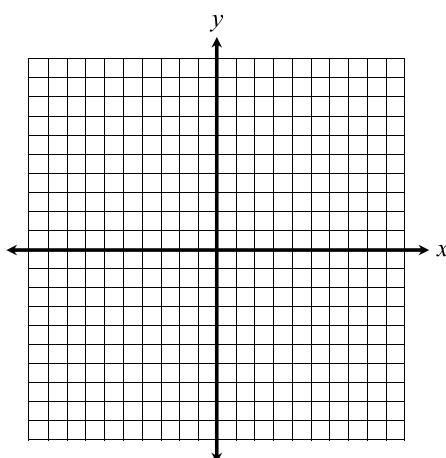
End Behavior:

As $x \rightarrow$ _____, $f(x) \rightarrow \infty$ As $x \rightarrow$ _____, $f(x) \rightarrow -\infty$

x-intercept: _____

Asymptote: _____

6. $f(x) = \log_5(x-2) + 1$



Domain: _____

Range: _____

End Behavior:

As $x \rightarrow$ _____, $f(x) \rightarrow \infty$ As $x \rightarrow$ _____, $f(x) \rightarrow -\infty$

x-intercept: _____

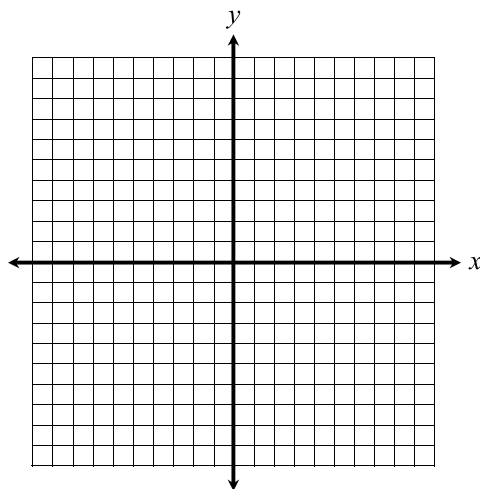
Asymptote: _____

Name: _____ Unit 7: Exponential & Logarithmic Functions

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**** This is a 2-page document! ******Directions:** Graph each function and identify its key characteristics.

1. $f(x) = \log_3 x$



Domain: _____

Range: _____

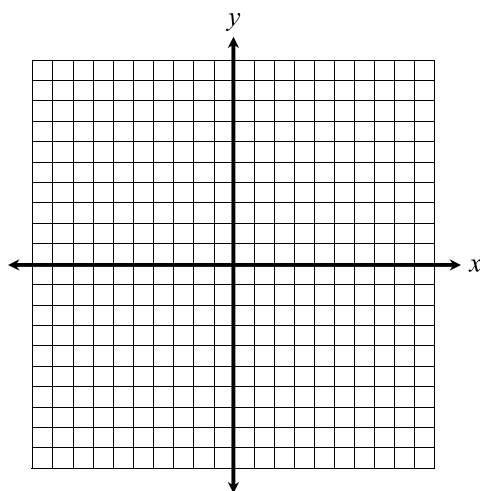
End Behavior:

As $x \rightarrow$ _____, $f(x) \rightarrow \infty$ As $x \rightarrow$ _____, $f(x) \rightarrow -\infty$

x-intercept: _____

Asymptote: _____

2. $f(x) = \log_{\frac{1}{2}} x + 3$



Domain: _____

Range: _____

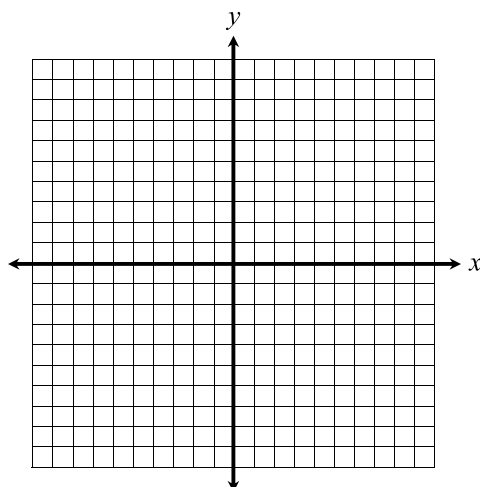
End Behavior:

As $x \rightarrow$ _____, $f(x) \rightarrow \infty$ As $x \rightarrow$ _____, $f(x) \rightarrow -\infty$

x-intercept: _____

Asymptote: _____

3. $f(x) = \log_4(x+5)$



Domain: _____

Range: _____

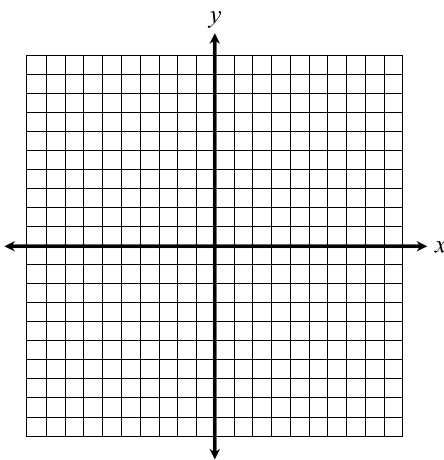
End Behavior:

As $x \rightarrow$ _____, $f(x) \rightarrow \infty$ As $x \rightarrow$ _____, $f(x) \rightarrow -\infty$

x-intercept: _____

Asymptote: _____

4. $f(x) = \log_2(x+8) - 4$



Domain: _____

Range: _____

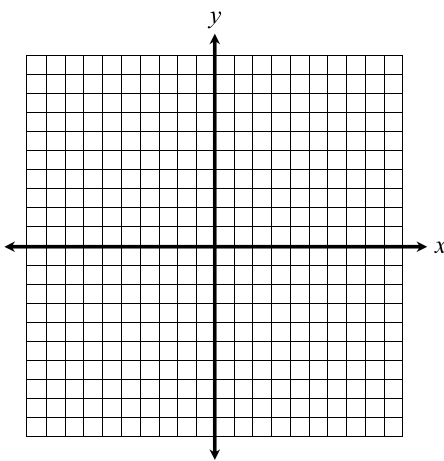
End Behavior:

As $x \rightarrow$ _____, $f(x) \rightarrow \infty$ As $x \rightarrow$ _____, $f(x) \rightarrow -\infty$

x-intercept: _____

Asymptote: _____

5. $f(x) = \log_{\frac{1}{3}}(x-4)$



Domain: _____

Range: _____

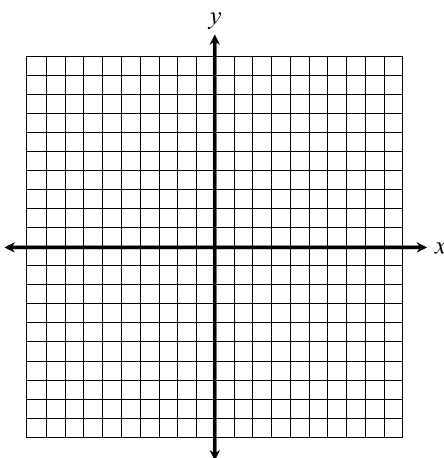
End Behavior:

As $x \rightarrow$ _____, $f(x) \rightarrow \infty$ As $x \rightarrow$ _____, $f(x) \rightarrow -\infty$

x-intercept: _____

Asymptote: _____

6. $f(x) = \log_5(x-2) - 1$



Domain: _____

Range: _____

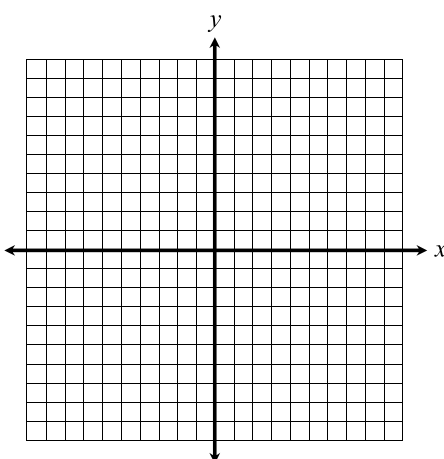
End Behavior:

As $x \rightarrow$ _____, $f(x) \rightarrow \infty$ As $x \rightarrow$ _____, $f(x) \rightarrow -\infty$

x-intercept: _____

Asymptote: _____

7. $f(x) = \log_{\frac{1}{4}}(x-1) + 1$



Domain: _____

Range: _____

End Behavior:

As $x \rightarrow$ _____, $f(x) \rightarrow \infty$ As $x \rightarrow$ _____, $f(x) \rightarrow -\infty$

x-intercept: _____

Asymptote: _____