

Review - Exponential and Logarithmic Functions

Score: _____ of _____

Name: _____

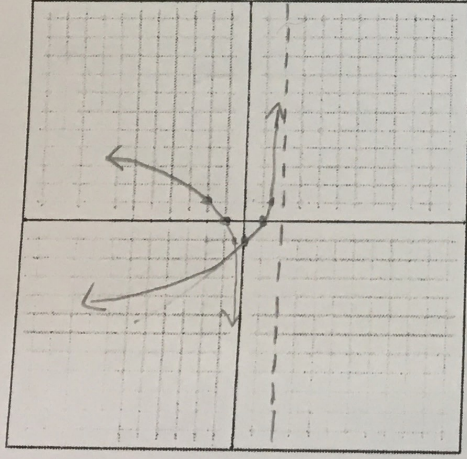
Date: _____

Period: _____

Percent: _____

Describe the transformations made to the parent function, then graph each of the following functions. Include the parent function in each graph. Draw asymptotes.

1. $f(x) = 2^{-x} - 2$



Reflect over y-axis

Down 2

Domain: $(-\infty, \infty)$

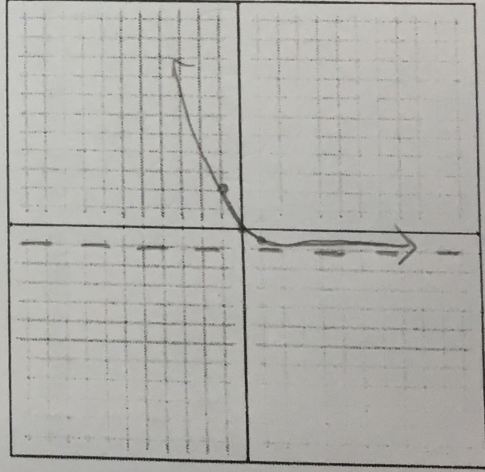
Range: $(-2, \infty)$

Describe the transformations made to the parent function, then graph each of the following functions. Draw asymptotes.

3. $h(x) = \log_3(x + 1)$

$f(x) = 3^x$

x	y
-1	1/3
0	1
1	3

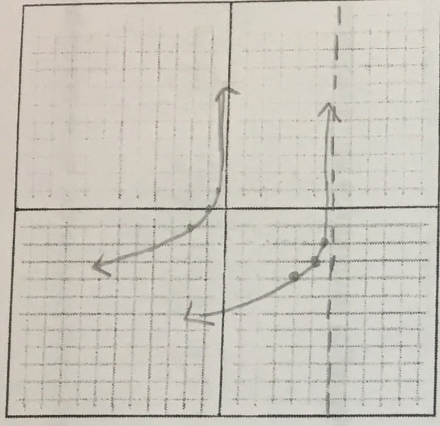


1 unit left

Domain: $(-1, \infty)$

Range: $(-\infty, \infty)$

2. $g(x) = (\frac{1}{2})^{x+3} - 6$



3 units left

6 units down

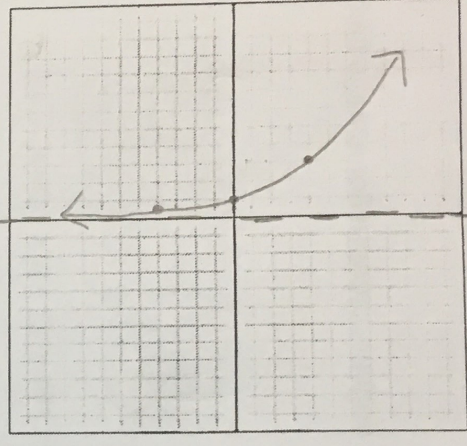
Domain: $(-\infty, \infty)$

Range: $(-6, \infty)$

Describe the transformations made to the parent function, then graph each of the following functions. Draw asymptotes.

4. $j(x) = -4 \log_3 x$

x	y
1/3	-1
1	0
3	1



Reflect over y-axis

vert. stretch by 4

Domain: $(0, \infty)$

Range: $(-\infty, \infty)$

5. Suppose that you have \$7500 to invest. Which investment yields the greater return over 7 years: 6.4% compounded monthly or 6.8% compounded quarterly?

$$A = 7500 \left(1 + \frac{0.064}{12}\right)^{12(7)}$$

$$A = \$11724.87$$

$$A = 7500 \left(1 + \frac{0.068}{4}\right)^4(7)$$

$$A = \$12023.97$$

The investment compounded quarterly yields more.
Write each equation in its equivalent exponential form.

6. $\log_b \sqrt{27} = \frac{1}{2}$

$$b^{1/2} = \sqrt{27}$$

7. $\log_{\frac{1}{2}} \frac{1}{64} = 6$

$$\left(\frac{1}{2}\right)^6 = \frac{1}{64}$$

Write each equation in its equivalent logarithmic form.

8. $4^{-2} = \frac{1}{16}$

$$\log_4 \frac{1}{16} = -2$$

9. $\sqrt[4]{6561} = 9$

$$\log_{6561} 9 = \frac{1}{4}$$

Evaluate each logarithm without a calculator.

10. $\log_9 3$

$$\frac{1}{2}$$

11. $\log_2 32$

$$5$$

12. $\log_3 \frac{1}{27}$

$$-3$$

13. $\log_3 \frac{1}{\sqrt{3}}$

$$-\frac{1}{2}$$

14. $\log_7 7^4$

$$4$$

15. $\ln e^{4x}$

$$4x$$

Find the domain of each logarithmic function.

16. $\log(2 - x)$

$$2 - x > 0$$

$$-x > -2$$

$$x < 2$$

$$(-\infty, 2)$$

17. $\ln(x + 7)^2$

$$x + 7 = 0$$

$$x = -7$$

$$(-\infty, -7) \cup (-7, \infty)$$

Expand each of the following logarithmic expressions. Evaluate where possible.

18. $\log_{49} 7x^5$

$$\log_{49} 7 + 5\log_{49} x$$

$$\frac{1}{2} + 5\log_{49} x$$

20. $\ln \frac{x^3 \sqrt{x^2+1}}{(x+1)^4}$

$$3\ln x + \frac{1}{2} \ln(x^2+1) - 4\ln(x+1)$$

19. $\log \frac{\sqrt[6]{x}}{4y^3}$

$$\frac{1}{6} \log x - \log 4 - 3\log y$$

21. $\log^5 \sqrt{\frac{x}{y}}$

$$\frac{1}{5} [\log x - \log y]$$

Condense each logarithm. Write the expression as a single logarithm whose coefficient is one.

22. $\frac{1}{3} \ln x + \ln y - \frac{1}{4} \ln z$

$$\ln \frac{\sqrt[3]{x} y}{\sqrt[4]{z}}$$

23. $\frac{1}{2} (\log_5 x + \log_5 y) - 2\log_5(x+1)$

$$\log_5 \frac{\sqrt{xy}}{(x+1)^2}$$

24. $\log x + \log(x^2 - 1) - \log 7 - \log(x+1)$

$$\log \frac{x(x^2-1)}{7(x+1)}$$

25. $\frac{1}{3} [2\ln(x+5) - \ln x - \ln(x^2 - 4)]$

$$\ln^3 \sqrt{\frac{(x+5)^2}{x(x^2-4)}}$$