Unit 4 Test Review
Learning Targets: 4A-4C
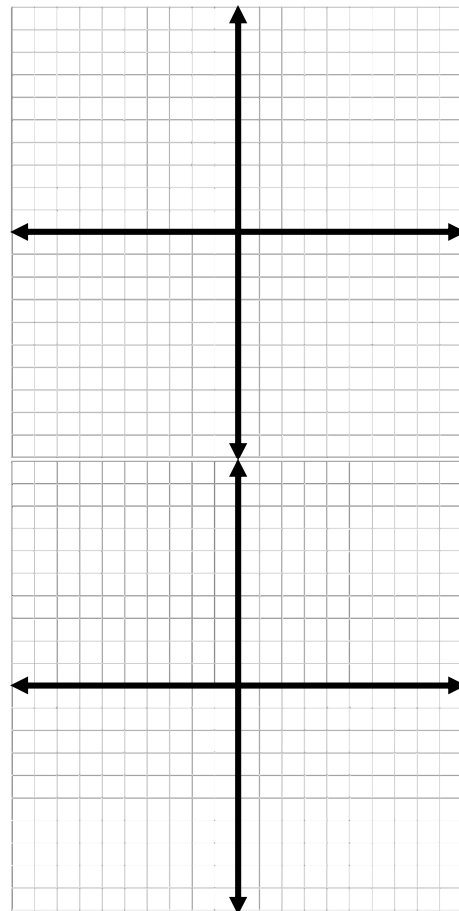
Complete the problems below, show your work, and write your answer in the blank provided.

Target 4A
I can graph and describe transformations for exponential and logarithmic functions.

1.   Describe the transformations that change $f(x) = \log_2 x$ to $g(x) = 3 + 2\log_2(x-3)$.

2.   Graph $f(x)=3(2)^x$.

3.   Graph $f(x) = 2 + \log_3(x-3)$

4.   Write the equation for $f(x) = 4^x$ that undergoes the transformations of being shifted 2 units right, 5 units down, and reflected across the y-axis.

5. Solve $3(8^x) = 50$ for *x.* Round your answer to the nearest tenth.

6. Given the function $f(x) = 3(0.5)^x$, does f(x) represent exponential growth or decay? Explain how we know.

7. Given the function $f(x) = \frac{12}{1+3(0.2)^x}$

    a. What is the limit of growth?

    b. What is the y-intercept of f(x)?

8. Write the exponential function that passes through the points (0, 5) and (4, 405).

9. Solve $\log_3 \sqrt{x-2} = 2$ for x.

10. Evaluate $\log_4 12$.

11. Write the expression as a single logarithm.

$2\log_3 X + 4\log_3 Y - 3\log_3 Z$

12. Write the expression as the sum or difference of logarithms.

$$\log_2 \left(\frac{x^2}{a^2 b^3} \right)$$

13. A telescope is limited in its usefulness by the brightness of the star it is aimed at and by the diameter of its lens. A formula for the limiting magnitude L of a telescope, that is, the magnitude of the dimmest star that it can be used to view, is given by
$$L(d) = 9 + 5.1log(d)$$
Where d is the diameter (in inches) of the lens.
   a) State the domain of this function.

   b) What is the limiting magnitude of a 3.5-inch telescope?

   c) What diameter is required to view a star of magnitude 14?

14. Calculate the number of years necessary for $250 to grow to $750 at 4.3%   compounded continuously. Use the compound interest formula: A=Pe^{rt},   where A = final amount, P = starting amount, r = interest rate (as a decimal), and t = time in years. Show your work and round your answer to the nearest tenth.

15. Use the data in the table below.

x	0.25	0.5	2	4	8	15
y	-2.52	-1.38	1.45	2.18	4.15	5.91

   a. Write a natural logarithmic function for the data.

   b. What is the value of the function when $x = 20$?