Name: _____   Date:_____

*Pre-Calculus 12*
Final Exam Written Response

Write your response in the space provided. Persent your response in a well-organized way, writing complete sentences and correct units.

1. Solve $4^x = 500$. Round your answer to two decimal places.

2. Consider graphs of the form $y - k = f(x - h)$ and $y = f(x)$. What is a general rule about the effects of h and k?
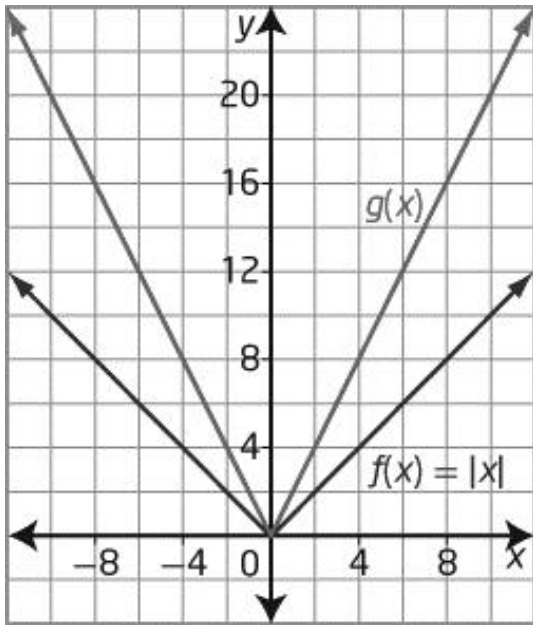
3. Given the function $y = f(x)$ shown, describe the transformations that must be applied to it in order to obtain the transformed function $y = 2f(3x)$. Sketch the transformed function using a table of values.
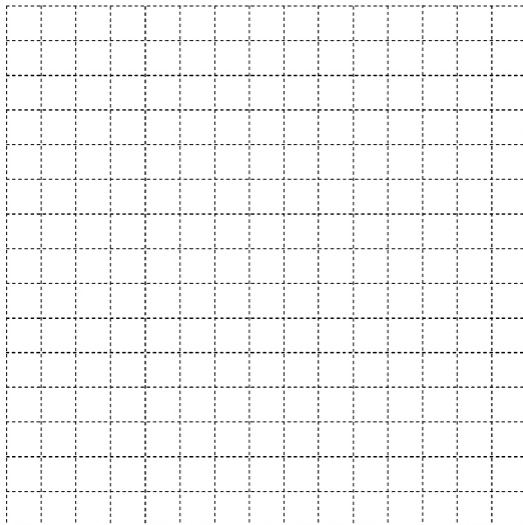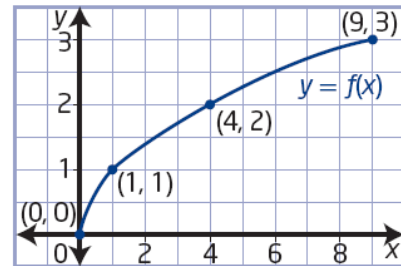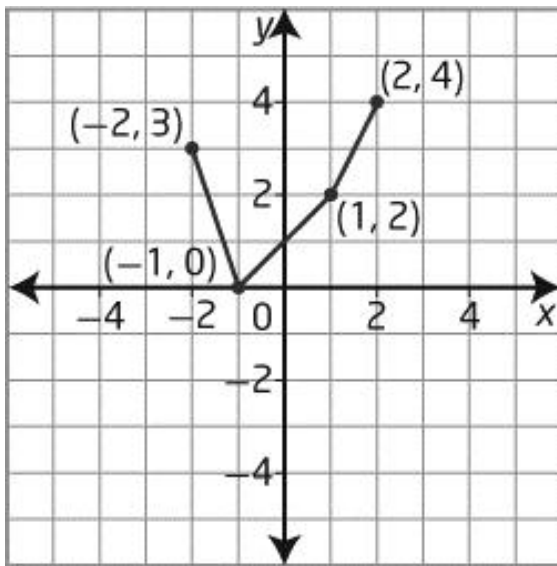
4. The graph of the function $y = f(x)$ has been transformed by either a stretch or a reflection. Write the equation of the transformed graph $g(x)$.
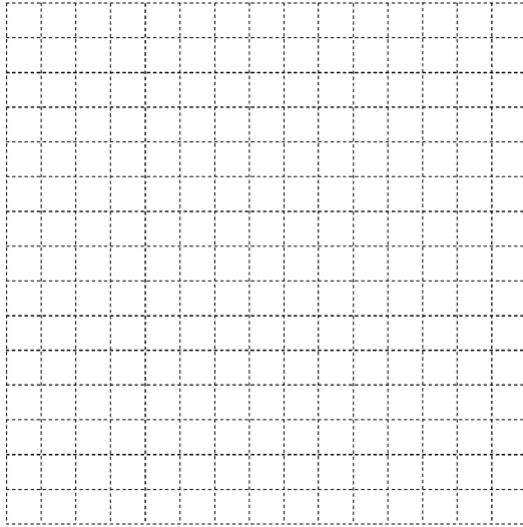

5. Given the graph of $y = f(x)$ shown, graph a reflection through the x-axis.

6. Sketch a graph of $y = \log_2 x$.

7. Describe the characteristics of the graph of $y = \log_2 x$. Include the domain, range, vertical asymptote, and intercepts.

8. An investor wants to find out how long it would take to double an investment if the interest rate was 1.5%. The exponential growth formula for compounding interest is $A = Pe^{rt}$ where A is final amount in the account, P is the initial amount invested in the account, r is the rate of interest, e is the irrational number $2.71828\ldots$, and t is time in years. How long would it take to double an initial investment of $2000?

9. The sum of $f(x) = x^2$ and $g(x) = x + 1$ is $h(x)$. Sketch a graph of $h(x)$ and determine the domain and range of the graph.
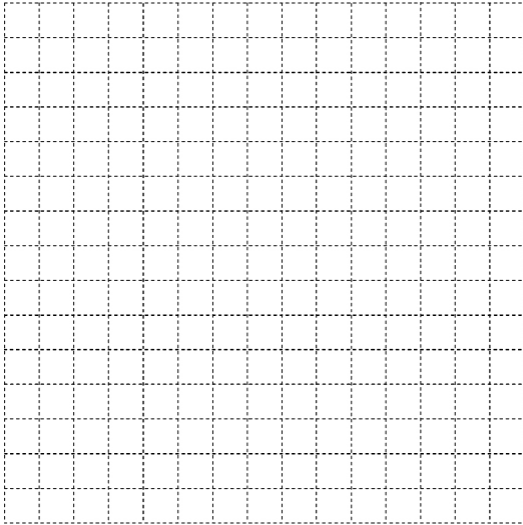
10. Divide $\dfrac{(2x^3 - x^2 + 3x - 2)}{(x - 2)}$ using synthetic division. Check the remainder using the remainder theorem. What is the relationship between the remainder and the value of $f(2)$?

11. Describe the rules for the graph of odd degree and even degree functions.

12. Suppose $f(x) = x + 4$ and $g(x) = 2x^2$. Find $f(g(x))$. State the domain and range of $f(g(x))$ and find $f(2)$.

13. Use an example to show why $_nC_r = {_n}C_{n-r}$.

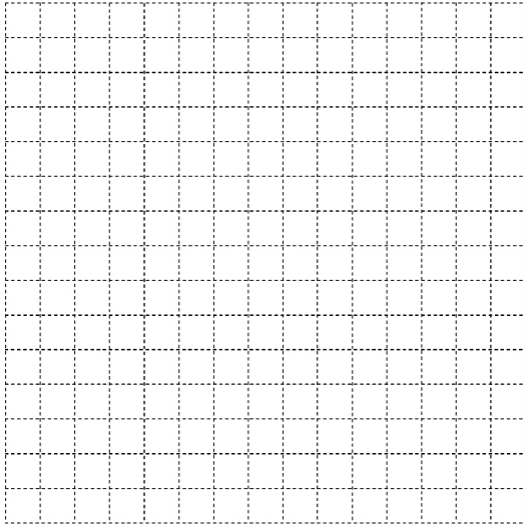**14.** Expand $(x + 3)^4$. Explain the connection between this expansion and Pascal's triangle.

15. Explain how to find the subsequent row in Pascal's triangle.

16. Sketch, without technology, the graph of $y = \sqrt{3(x+7)}$ using transformations. Explain your approach.

17. Find the general solution to $2\cos x = 1$.

18. Find the measure of two angles that are coterminal with 120° and whose measures lie between −500° and +500°. Give the expression that represents any coterminal angle with 120° where n is an integer.