Answer each non-graph question neatly on the line provided.

Name: _____

1. (5 points) Find the range of $f(x) = -x^2 - 6x$. Express your answer in interval notation.

1. _____

2. (5 points) Find the maximum or minimum value of $f(x) = x^2 - 6x + 3$.

2. _____

3. (5 points) Evaluate $\log_3\left(\frac{1}{\sqrt{3}}\right)$.

3. _____

4. (5 points) Solve $3 \cdot 6^{1-x} = 15$ for x.

4. _____

5. (5 points) Evaluate $\log_2(144) - \log_2(18)$. Simplify your answer completely.

5. _____

6. (5 points) Solve $1 + \log_3(x + 1) = -3$ for x.

6. _____

7. (5 points) Solve $\frac{10}{1+e^{-x}} = 2$ for x. You may leave ln in your answer.

7. _____

8. (5 points) This question uses the population growth model. A culture of bacteria starts at 4000 bacteria. After one hour the count is 5000. How many hours will the number of bacteria double?

8. _____

9. (5 points) Evaluate $g(f(-1)) - f(g(-1))$ when $f(x) = 5x - 6$ and $g(x) = 6 - x^2$.

9. _____

10. (5 points) Use the table

x	1	2	3	4	5	6
$f(x)$	2	3	5	1	6	3
$g(x)$	3	4	5	2	6	1

to evaluate $g^{-1} \circ f(6)$.

10. _____

11. (5 points) Find the degree measure of the angle $-\frac{5\pi}{2}$ radians.

11. _____

12. (5 points) From the top of a 200 ft lighthouse, the angle of depression to a ship in the ocean is $32°$. How far is the ship from the base of the lighthouse? You may leave sin, cos, or tan in your answer.

12. _____

13. (5 points) Find x when $\log 0.001 = x$.

13. _____

14. (5 points) Find an angle between 0 and 2π that is coterminal with $\frac{51\pi}{2}$.

14. _____

15. (5 points) Find the length of the arc that subtends a central angle of measure $\frac{3\pi}{4}$ in a circle of radius 10 cm.

15. _____

16. (5 points) Evaluate $\log_2 8^{33}$.

16. _____

17. (5 points) Sketch the graph $y = \log_6(x+1)$ not by plotting points but by transforming a known graph. Label all intercepts and asymptotes on your sketch. State the domain and range using interval notation.

18. (5 points) Sketch the graph $y = 4 + \left(\frac{1}{3}\right)^x$ not by plotting points but by transforming a known graph. Label all intercepts and asymptotes on your sketch. State the domain and range using interval notation.

19. (5 points) Sketch the graph $f(x) = -x^4 + 9x^2$. Label all intercepts on your sketch and describe its end behavior

20. (5 points) Find $f^{-1}(x)$ when $f(x) = \frac{2x+5}{x-7}$.