Math 110 Test 3 **Name:** _____

No Calculators or Computing Devices on this section. Once you turn this section in, you may NOT have it back! Use Algebraic Notation AND Show All of Your Work.

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1. (5 points) **Find the standard form of the equation of the ellipse with the given characteristic(s) and center at the origin.**

   Foci: $(x, y) = \Big(\pm 2, 0 \Big)$; major axis of length 10

   1. _____

2. (5 points) **Write the equation of a circle in standard form, and then find its center and radius.**

$$x^2 + y^2 - 16x - 4y + 59 = 0$$

   2. _____

3. (5 points) This is a ***Matching question*** associated with the theory on graphical translations of functions. Suppose $f(x) = 3^x$. Relative to the graph of $f(x)$ the graphs of the following functions have been changed in what way?

____	$g(x) = -\cdot 3^x$	a.) shifted 5 units right
____	$g(x) = 3^{(x+5)}$	b.) reflected about the x axis
____	$g(x) = 3^x + 5$	c.) shifted 5 units up
____	$g(x) = 3^{(x-5)}$	d.) shifted 5 units left
____	$g(x) = 3^x - 5$	e.) shifted 5 units vertically down

4. (4 points) **Use the One-to-One Property to solve the equation for x.**

$$2^{2x-3} = \frac{1}{4}$$

4. _____

5. (1 point) What number is $\log_3(1)$ equal to? 5. _____

6. (1 point) What number is $\log_5(25)$ equal to? 6. _____

7. (1 point) What number is $\ln(e)$ equal to? 7. _____

8. (4 points) Graph the function $f(x) = -\log_3(x+1)$

9. (1 point) What is the domain of $f(x)$? 9. _____

10. (1 point) What equation represents the vertical asymptote of $f(x)$?

10. _____

11. (4 points) Solve the equation.

$$\log_4(x-3) = 2$$

11. _____

12. (5 points) Solve the system $\begin{cases} 2x + 3y = 17 \\ 5x - y = 17 \end{cases}$

12. _____

Calculator Section **Name:** _____

Directions: After you turn this in, please pick up the no-calculator section of the exam, which has 12 questions. You are allowed to take THIS paper back to work on or double check your work, AFTER you turn in the no-calculator section of the exam.

13. (5 points) The number of bacteria in a culture is increasing according to the law of exponential growth. After 3 hours, there are 100 bacteria, and after 5 hours there are 600 bacteria. How many bacteria will there be after 8 hours

13. _____