Instructions: Work on this on your own, without consulting your book/the internet/any outside source. No calculators. Give yourself no more than 90 minutes to work on it. The idea is for the instructors to get a sense for what you can and cannot do at this point in time. Your performance on this pre-test will not affect your grade in the course. If you cannot fully solve a problem, feel free to write about how you think you would solve it if you had the proper mathematical tools, and also feel free to write down related facts/concepts/ideas that you know. Also, show your work. We're interested in how you arrived at your answers. You may write on the back if necessary.

1) Find all $x$ such that $x^3 + 3x^2 - 10x = 0$
2) Find all $x$ such that $2x^2 + 5x - 6 = 0$

3) Find all $x$ such that $3x^2 + x + 4 = 0$
4) Find all $x$ such that $x^2 + 2x = 8$

5) Graph the function $f$, given by $f(x) = x^2 + 3$
6) Graph the function \( g \), given by \( g(x) = f(x) + 4 \) (see problem 5)

7) Graph the function \( h \), given by \( h(x) = f(x+4) \) (see problem 5)
8) Graph the function \( j \), given by \( j(x) = \sin(x) \).

9) Find all \( x \) such that \( e^x = 3 \).

10) Find all \( x \) such that \( 5^{3x+7} = 125 \).
11) The figure below is meant to be a circle with radius 1 and center (0,0).

Find $x_1, y_1, x_2, y_2$, and $\alpha$. 