Name:

Math 1650 Section 622

Exam number 1

Show all work. How you get your answer is just as important, if not more important, than the answer itself. If you think it, write it!

1. (20 pts.) Find the equation of the line L which passes through the point (1,2) and is perpendicular to the line

$$3x + y = 5$$

   Where does L hit the x-axis??

2. (14 pts.) What symmetries (x,y,origin), if any, do the graphs of the following functions/equations have??

   (a) $y = x^4 - 3x^2 + 17$

   (b) $x^2 + y^3 = 5$

   (c) $xy^2 + yx^2 = 1$

3. (20 pts.) Find the standard form for the quadratic function

$$f(x) = 2x^2 - 5x - 3$$

and use this information to sketch a graph of f. What is the lowest value that the function takes??

4. (15 pts.) Find an inverse of the polynomial function

$$f(x) = 2x^2 + 4x - 1$$

(Hint: putting it in standard form, first, can help!). Be sure to describe what domain you pick to first make it one-to-one.

5. (15 pts.) Show that the polynomial function

$$f(x) = x^5 + x^2 + 3$$

has at least one root. Which two consecutive integers does your root lie in between?

6. (8 pts. each) For the polynomial function

$$f(x) = x^4 - 3x^2 + 4x - 6$$

use (synthetic or polynomial long) division to write $f(x)$ as

(a) $(x-2)g(x) + c$

(b) $(x+1)h(x) + d$