1. [10 pts.] Find the inverse for the one-to-one function $f(x) = x^3 + 7$.

2. [20 pts.] Find the inverse for $h(x) = \dfrac{2x - 3}{x + 4}$. Also state the domain and the range of both h and h^{-1}.

3. [10 pts.] Determine analytically (not with a graph) whether the given function is linear or nonlinear. If it is linear, determine the equation of the line.

x	y
-20	-8
-10	-3
0	0
10	3
20	8

4. [10 pts. each] Consider the quadratic function $f(x) = 2x^2 - x + 2$...

   (a) Find the vertex and axis of symmetry.

   (b) Write $f(x)$ in the form $a(x - h)^2 + k$. Determine the domain and range of f.

5. [10 pts.] Find the point on the line $y = x$ that is closest to the point $(-1, 2)$.[1]

6. [10 pts. each] Solve each glorious inequality.

   (a) $x(x + 1) > 20$

   (b) $x^3 - 2x^2 - 3x < 0$

   (c) $\dfrac{3x - 5}{x + 2} \le 2$

7. [10 pts.] Construct a polynomial function f of degree 3 and having $-2, 1, 4$ as zeros.[2]

8. [15 pts.] Find all asymptotes for the rational function $R(x) = \dfrac{x^3 - 8}{x^2 - 5x + 6}$

9. [15 pts.] Find *exactly* the real zeros of f and fully factor $f(x)$, where
$$f(x) = 2x^4 + 11x^3 - 5x^2 - 43x + 35.$$

10. [15 pts.] Construct a degree 4 polynomial function f with *real* coefficients and having zeros $3 + 2i$ (with multiplicity 1) and 4 (with multiplicity 2). Write the polynomial in standard form!

11. [15 pts.] Find the complex zeros of f and fully factor $f(x)$, where
$$f(x) = x^3 - 8x^2 + 25x - 26.$$

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[1] You will recall that a homework problem like this was discussed extensively one day in class.
[2] For 10 points extra credit: make f such that $f(5) = 16$.