Please turn in solutions for the following problems:

(1) Use the rules for differentiation to find the derivative of each function.

(a) $f(z) = e^{z^3 - z}$

(b) $f(z) = \cos^3(z^2)$

(c) $f(z) = (\text{Log}(z))^3$, where z is not on the negative real axis

(2) Suppose that f is an entire function such that $f(z) = u(z) + iv(z)$, where $u(x + iy) = 2x^2 + 2x + 1 - 2y^2$. Determine what v must be.

(3) Let w be a function from $\mathbb{R}$ to $\mathbb{C}$ defined by $w(t) = t^2 - e^{it}$.
(a) Compute the derivative $w'(t)$.

(b) Compute the integral $\int_0^3 w(t)\, dt$.

In addition, I suggest that you work these problems from the Brown/Churchill textbook (but do not turn in):

- Page 71, problems 2, 4
- Pages 77, problems 1, 2
- Page 81, problem 1
- Page 104, problem 9
- Page 121, problems 2, 4