Turn in starred problems Tuesday 2/6/2007.

2(a), *2(b), 5(a).

*5(b) and *10(c). Think about these two problems together. Show that if you calculate the derivative of $1/z$ (i) by the rule for powers (or equivalently the quotient rule), (ii) directly as a limit, from (8), as in Example 2, or (iii) by any of the formulas (19), the answer is the same.

*9. Hint: this is a bit tricky. To calculate any partial derivatives of $u(x, y)$ or $v(x, y)$ at $x = y = 0$, or to try to calculate the derivative of f at $z = 0$, you *must* use the direct definition of the derivative as a limit, since there is a special formula for $f(0)$. Calculate all the partial derivatives this way, then try to calculate $f'(0)$ as $z \to 0$ along the direction $x = y$.

As an additional exercise (not to be turned in): From the results of the problem, and Theorem 21.5.1 (or more properly from the version of this theorem stated in class) we know that not all of the partial derivatives u_x, u_y, v_x, and v_y can be continuous at $x = y = 0$. Be sure you understand why this is true, then show it by direct calculation.

*10(a), 10(g), *12(b), 14(a). Hint for 14(a): use the Cauchy-Riemann equations.