MATH 307 — Quiz #2

Instructions: You have 50 minutes to solve all three multipart problems. All answers should be exact – no decimal approximations. No calculators, notes, or other aids. Hand in only your solution booklet. There are 21 points available, plus 1 bonus point, but I'll record the grade out of 20.

1. Compute the derivative
$$\frac{\partial}{\partial \bar{z}} e^x \cos(y)$$

2. Find a harmonic conjugate of $u(x, y) = e^x \sin y + y^2 - x^2$.

3. For which z is the function
$$f(z) = \overline{e^{-\bar{z}^2}}$$
analytic?

4. For which z is the function
$$f(z) = \frac{x \cos y - y \sin y + i(x \sin y - y \cos y)}{x^2 + y^2}$$
analytic?