MATH 307 — Quiz #2

Instructions: You have 50 minutes to solve all three problems. All answers should be exact – no decimal approximations. No calculators, notes, or other aids. Hand in only your solution booklet.

1. (3 points) Find an analytic function $g(z)$ such that

$$\frac{\partial}{\partial \bar{z}} e^x \cos(y) = g(\bar{z}).$$

2. (3 points) Find a harmonic conjugate of

$$u(x, y) = e^x \sin y + 2xy + y,$$

   i.e., a harmonic function $v(x, y)$ such that $f = u + iv$ is analytic.

3. (3 points) For which z is the function

$$f(z) = \overline{e^{-\bar{z}^2}}$$

   analytic? Justify your answer.