3. $u(x,y) = 8x^2 - ky^2 - (5+A)^2$

$u(x,y) = 8x^2 - ky^2 - (5+5)^2$

$u(x,y) = 8x^2 - ky^2 - 100$

a. $u_x = 16x$ $\qquad u_y = -2ky$

$u_{xx} = 16$ $\qquad u_{yy} = -2k$

$u_{xx} + u_{yy} = 0$

$16 - 2k = 0$

$2k = 16$

$k = 8$ //

b. $u_x = 16x$ $\qquad v_x = \frac{\partial v}{\partial x}$

$u_y = -2ky$ $\qquad v_y = \frac{\partial v}{\partial y}$

$u_y = -16y$

$u_x = v_y$

$16x = \frac{\partial v}{\partial y}$

$v = \int 16x\, dy$

$v = 16xy + g(x)$

$u_y = -v_x$

$-16y = -\frac{\partial v}{\partial x}$

$16y = \frac{\partial}{\partial x}(16xy + g(x))$

$16y = 16y + g'(x)$

$g'(x) = 0$

$g(x) = c$

$v = 16xy + g(x)$

$v = 16xy + c$

$f(x+iy) = u + iv = 8x^2 - 8y^2 - 100 + i(16xy + c)$ //