Name:_____

MA 3330: Quiz 4

1. Compute the Jacobians $J(u.v)$ and $J(x, y)$. for
   (a) $x = 2u$, y= $3v$, where S is the square of vertices $(-1, 1)$, $(-1, -1)$, $(1, -1)$, and $(1, 1)$.
   (b) $x = u^4$, $y = u^2 + v$, where S is the triangle of vertices $(-2, 0)$, $(2, 0)$, and $(0, 2)$.

2. Use the transformation $y - x = u$, $x + y = v$ to evaluate the integral over the square R determined by the lines $y = x$, $y = -x + 2$, $y = x + 2$, and $y = -x$.
$$\iint_R e^{x+y} dA$$

3. Use the transformation $u = x + y$, $v = x - y$ to evaluate the integrals on the region R determined by the points $(1, 0)$, $(2, 0)$, $(0, 2)$, and $(0, 1)$.
$$\iint_R (x^2 - 2xy + y^2) e^{x+y} dA$$

4. Integrate outside of the ellipse $x^2+4y^2 = 4$ and in side the ellipse $x^2+4y^2 = 16$.
$$\iint_R e^{x^2+4y^2} dA$$