
Show all work. 5 points each. Be sure to draw the region D for problem 2.

1. Find the Jacobian, $\frac{\partial(x, y)}{\partial(s, t)}$, of the transformation $x = e^{s+t}$, $y = e^{s-t}$

2. Use polar coordinates to evaluate the integral, where D is the upper half of the disk $x^2 + y^2 = 4$.

$$\iint_D x^2 + y^2 dA$$