

Laplace's equation and find its corresponding analytic function

6. (a) Evaluate by Stoke's theorem  $\int_C (xy dx + xy^2 dy)$  where C is the square in the xy-plane with vertices  $(1,0)$ ,  $(0,1)$ ,  $(-1,0)$ , and  $(0,-1)$
- (b) Find the bilinear transformation, which maps the points  $z = -1, 1, \infty$  onto the points  $w = -i, -1, i$ . 6
- (c) Show that the general solution of  $\frac{d^2 y}{dx^2} + 4x^2 y = 0$  is  $y = \sqrt{x} [A J_{1/4}(x^2) + B J_{-1/4}(x^2)]$  where A and B are constants. 8