

Find the gradient  $\nabla g$  of the function  $g(x, y) = r^5$ , where  $r = \sqrt{x^2 + y^2}$ . Hint: introduce a new variable,  $u = x^2 + y^2$ . Express  $g(x, y)$  in terms of  $u$  and use the chain rule to find  $dg/dx$  and  $dg/dy$ .