

Name \_\_\_\_\_

Homework 14  
Section 14.7

1. (7) Find the quadratic Taylor polynomial  $Q(x, y)$ , near  $(1, 5)$  for the function  $f(x, y) = \sqrt{2y - x}$ .

2. (6) Is there a continuous differentiable function  $f$  which has the following partial derivatives? If so, what is it? Are there others? If not, explain why you know there aren't. [Hint: What else was in this section of the book other than the approximations?]

$$f_x = \frac{2xy}{1 + x^2 + y^2} \qquad f_y = 2xy \ln(1 + x^2 + y^2)$$

3. (7) Show that the function  $F(x, y) = \tan^{-1} \left( \frac{y}{x} \right)$  satisfies Laplace's equation:

$$\frac{\partial^2 F}{\partial x^2} + \frac{\partial^2 F}{\partial y^2} = 0.$$