Name _____

Homework 13
Section 14.7

1. (7) Find the quadratic Taylor polynomial $Q(x, y)$, near $(1, 4)$ for the function $f(x, y) = \sqrt{x + 2y}$.

2. (6) Is there a continuous differentiable function f which has the following partial derivatives? If so, what is it? Are there others? [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:

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