MA 213 Worksheet #10

Section 14.3
9/27/18

1 Find the first partial derivatives of the function

14.3.15 (a) $f(x, y) = x^4 + 5xy^3$
14.3.21 (b) $f(x, y) = x/y$
14.3.33 (c) $w = \ln(x + 2y + 3z)$
14.3.35 (d) $p = \sqrt{t^4 + u^2 \cos v}$

2 Find $\partial z/\partial x$ and $\partial z/\partial y$ in terms of the derivatives of f and g:

14.3.51 (a) $z = f(x) + g(y)$
14.3.51 (b) $z = f(x + y)$
14.3.52 (c) $z = f(x)g(y)$
14.3.52 (d) $z = f(x/y)$

3 Find all the second partial derivatives.

14.3.53 (a) $f(x, y) = x^4y - 2x^3y^2$
14.3.55 (b) $z = \dfrac{y}{2x + 3y}$

4 Find the indicated partial derivative(s).

14.3.63 $f(x, y) = x^4y^2 - x^3y; \quad f_{xxx}, \quad f_{xyx}$
14.3.67 $W = \sqrt{u + v^2}; \quad \dfrac{\partial^3 W}{\partial u^2 \partial v}$

5 *14.3.77* Verify that the equation $u = 1/\sqrt{x^2 + y^2 + z^2}$ is a solution of the three-dimensional Laplace equation $u_{xx} + u_{yy} + u_{zz} = 0$.

6 *14.3.47* Use implicit differentiation to find $\partial z/\partial x$ and $\partial z/\partial y$ if $x^2 + 2y^2 + 3z^2 = 1$.