Partial Derivatives

1. Find both first partial derivatives
(Similar to p.914 #9-40)

$$f(x, y) = 7x - 3y + 1$$

2. Find both first partial derivatives
(Similar to p.914 #9-40)

$$f(x, y) = 8x^2 y^3 - 7y + 4x^5$$

3. Find both first partial derivatives
(Similar to p.914 #9-40)

$$z = e^{2x-5y}$$

4. Find both first partial derivatives
(Similar to p.914 #9-40)

$$z = \ln\left(5x^2 - 3y^2\right)$$

5. Find both first partial derivatives
(Similar to p.914 #9-40)

$$z = \sqrt[3]{8xy - y^2}$$

6. Find both first partial derivatives
(Similar to p.914 #9-40)

$$f(x,y) = e^{x^2-y}\cos(x^2 y)$$

7. Use the limit definition of partial derivatives to find $f_x(x, y)$ and $f_y(x, y)$
(Similar to p.914 #41-44)

$$f(x,y) = x^2 - 3y$$

8. Evaluate f_x and f_y at the given point
(Similar to p.914 #45-52)

$$f(x,y) = e^x y^3 \qquad (0,2)$$

9. Evaluate f_x and f_y at the given point
(Similar to p.914 #45-52)

$$f(x,y) = \frac{3x-y}{2x+5y} \qquad (1,2)$$

10. Find the slopes of the surface in the x- and y-directions at the given point
(Similar to p.914 #53-54)

$$g(x,y) = 7 - x^3 - 2y^2 \qquad (1,0,6)$$

11. Find the first partial derivatives with respect to x, y, and z
(Similar to p.914 #59-64)

$$w = \sqrt[3]{3x^2 - y^2 + 5z^4}$$

12. Evaluate f_x, f_y, and f_z at the given point
(Similar to p.915 #65-70)

$$f(x,y,z)=2x^2z-4xy^2z^3-5y^3z^2,\quad (1,0,3)$$

13. Evaluate f_x, f_y, and f_z at the given point
(Similar to p.915 #65-70)

$$f(x,y,z)=x^2\tan(z-y),\quad \left(2,0,\frac{\pi}{4}\right)$$

14. Find the four second partial derivatives. Observe that the second mixed partials are equal
(Similar to p.915 #71-79)

$$z=x^4-7x^2y+y^3$$

15. Find the four second partial derivatives. Observe that the second mixed partials are equal
(Similar to p.915 #71-79)

$$z=e^y\cos x$$

16. For f(x, y), find all values of x and y such that $f_x(x, y) = 0$ and $f_y(x, y) = 0$ simultaneously
(Similar to p.915 #81-88)

$$f(x,y)=2x^2+5xy+2y^2+2x-2y$$

17. Show that the mixed partial derivatives f_{xyy}, f_{yxy}, and f_{yyx} are equal
(Similar to p.915 #93-96)

$$f(x,y,z)=e^{x+z}\cos(yz)$$