MATH 232 NAME:
14.5

Partial solutions for 1 3 7 9 11 15 21 23 31 32

1. $\dfrac{\partial z}{\partial t} = (y^3 - 2xy)(2t) + (3xy^2 - x^2)(2t)$

3. $\dfrac{\partial z}{\partial t} = \dfrac{1}{2\sqrt{t}} \cos(x)\cos(y) + \dfrac{1}{t^2} \sin(x)\sin(y)$

7. $\dfrac{\partial z}{\partial s} = 5(x-y)^4(2st - t^2)$, $\dfrac{\partial z}{\partial t} = 5(x-y)^4(s^2 - 2st)$

9. $\dfrac{\partial z}{\partial s} = \dfrac{3\sin(t) - 2t\sin(s)}{3x + 2y}$, $\dfrac{\partial z}{\partial t} = \dfrac{3s\cos(t) + 2\cos(s)}{3x + 2y}$

11. $\dfrac{\partial z}{\partial s} = e^r \left(t\cos(\theta) - \dfrac{s}{\sqrt{s^2+t^2}} \sin(\theta) \right)$, $\dfrac{\partial z}{\partial t} = e^r \left(s\cos(\theta) - \dfrac{t}{\sqrt{s^2+t^2}} \sin(\theta) \right)$

15. $g_u(0,0) = 7$, $g_v(0,0) = 2$

21. $\dfrac{\partial z}{\partial s} = (4x^3 + 2xy)(1) + (x^2)(tu^2)$, $\dfrac{\partial z}{\partial t} = (4x^3 + 2xy)(2) + (x^2)(su^2)$, $\dfrac{\partial z}{\partial u} = (4x^3 + 2xy)(-1) + (x^2)(2stu)$.

At $s = 4$, $t = 2$, and $u = 1$, $\dfrac{\partial z}{\partial s} = 1582$, $\dfrac{\partial z}{\partial t} = 3164$, and $\dfrac{\partial z}{\partial u} = -700$

23. $\dfrac{\partial w}{\partial r} = (y+z)(\cos\theta) + (x+z)\sin(\theta) + (y+x)\theta$

$\dfrac{\partial w}{\partial \theta} = (y+z)(-r\sin\theta) + (x+z)(r\cos\theta) + (y+x)(r)$

At $r = 2$ and $\theta = \pi/2$, $\dfrac{\partial w}{\partial r} = 2\pi$, $\dfrac{\partial w}{\partial \theta} = -2\pi$

31. $\dfrac{\partial z}{\partial x} = -\dfrac{F_x}{F_z} = -\dfrac{x}{3z}$, $\dfrac{\partial z}{\partial y} = -\dfrac{F_y}{F_z} = -\dfrac{2y}{3z}$

32. $\dfrac{\partial z}{\partial x} = -\dfrac{F_x}{F_z} = -\dfrac{x}{z-1}$, $\dfrac{\partial z}{\partial y} = -\dfrac{F_y}{F_z} = \dfrac{y}{z-1}$