P. 961

34. $\dfrac{\partial z}{\partial u} = (-y \sin xy - y \sin x)(2u) + (-x \sin xy + \cos x),$

$\dfrac{\partial z}{\partial v} = (-y \sin xy - y \sin x) + (-x \sin xy + \cos x)(-2v)$

40. $\dfrac{\partial z}{\partial x} = \dfrac{2xz^3 - yze^{xyz}}{xye^{xyz} - 4yz^3 - 3x^2z^2}, \quad \dfrac{\partial z}{\partial y} = \dfrac{z^4 - xze^{xyz}}{xye^{xyz} - 4yz^3 - 3x^2z^2}$

44. $\dfrac{25}{6}$

46. $\nabla f(0,1,2) = 2\mathbf{i} + \mathbf{k}$ is the direction of most rapid increase. The rate of increase in that direction is $|\nabla f(0,1,2)| = |2\mathbf{i} + \mathbf{k}| = \sqrt{5}$.

50. $(0,0)$ is a saddle point. $(1, \frac{1}{2})$ is a local minimum.

54. The absolute maximum of f on D is $f(0,\pm 1) = 2e^{-1}$ and the absolute minimum is $f(0,0) = 0$.

58. The absolute maximum is $f(\sqrt{2}, \sqrt{2}) = \sqrt{2}$ and the absolute minimum is $f(-\sqrt{2}, -\sqrt{2}) = -\sqrt{2}$.

P. 1035

10. $\displaystyle\int_0^4 \int_{y-4}^{4-y} f(x,y)\, dx dy$

14. $\dfrac{1}{4}(1 - \cos 1)$

16. $\dfrac{2}{5}$

24. $\dfrac{1}{3}$

34. $\dfrac{\pi}{6}$

36. (a) $(\bar{x}, \bar{y}) = \left(\dfrac{4}{3\pi}a, \dfrac{4}{3\pi}a \right),$ (b) $(\bar{x}, \bar{y}) = \left(\dfrac{5}{32}\pi a, \dfrac{5}{8}a \right)$

38. $\dfrac{3\pi}{a^2}\sqrt{a^2 + 1}$