Math 127 Review – Test 2 Answer Key

Chapter 14 Review

35. $\dfrac{\partial w}{\partial t} = e^t + \dfrac{2y}{z}(3t^2+4) - 2t\dfrac{y^2}{z^2}$

36. $\dfrac{\partial z}{\partial u} = \cos x - 2uy\sin x - (\sin xy)(x+2uy), \quad \dfrac{\partial z}{\partial v} = -2v\cos x + (\sin xy)(2vx-y) - y\sin x$

40. $\dfrac{\partial A}{\partial t} = \dfrac{35+50\sqrt{3}}{2} \approx 60.8 \text{ in}^2/\text{s}$

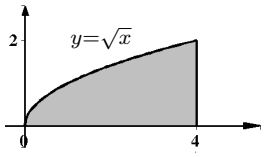
46. $\nabla f(1,2,3) = \left\langle 6, 1, \dfrac{1}{4} \right\rangle, \quad \mathbf{u} = \left\langle \dfrac{2}{3}, \dfrac{1}{3}, -\dfrac{2}{3} \right\rangle, \quad D_{\mathbf{u}} f(1,2,3) = \dfrac{25}{6}$

48. The direction of most rapid increase at the point $(0,1,2)$ is $\langle 2,0,1\rangle$; the rate is $\sqrt{5}$.

54. $f(0,-2) = -2/e$ is a local minimum; there are no local maxima or saddle points.

15.3:

37. $\int_0^2 \int_{y^2}^4 f(x,y)\,dx\,dy$



15.8:

29. $V = \dfrac{\pi}{3}(2-\sqrt{2})$

Chapter 15 Review

13. $\int_0^1 \int_0^y \cos(y^2)\,dx\,dy = \dfrac{1}{2}\sin 1$ **22.** $\dfrac{1}{3}(2^{3/2}-1)$ **27.** $\dfrac{64}{15}$ **30.** $\dfrac{53}{20}$

16.1:

24. $\nabla f(x,y,z) = \left(\cos\dfrac{y}{z}\right)\mathbf{i} - \dfrac{x}{z}\left(\sin\dfrac{y}{z}\right)\mathbf{j} + \dfrac{xy}{z^2}\left(\sin\dfrac{y}{z}\right)\mathbf{k}$

16.2:

22. π

Chapter 16 Review

6. $e - \dfrac{9}{70}$

Chapter 14 Review

52. One critical point: $(1, 1/2)$; $\quad f(1, 1/2) = -1$ is a local minimum.

15.3:

38. $\int_0^4 \int_0^{y/4} f(x, y)\, dx\, dy$

15.4:

10. $\displaystyle\int_{\pi/2}^{3\pi/2} \int_1^2 (r\cos\theta + r\sin\theta) r\, dr\, d\theta = -14/3$

15.8:

24. $\displaystyle V = \int_{\pi/4}^{\pi/2} \int_0^{2\pi} \int_0^2 \rho^2 \sin\phi\, d\rho\, d\theta\, d\phi = \frac{8\sqrt{2}\,\pi}{3}$

34. $\dfrac{1}{96}$ $\qquad$ **36.** $\dfrac{486\,\pi(\sqrt{2}-1)}{5}$

Chapter 15 Review

14. $\dfrac{e-1}{4}$ $\qquad$ **18.** $\dfrac{\pi}{4} - \dfrac{1}{2}\ln 2$

16.1:

12. Corresponds to IV (since the x-component of each vector is constant).

14. Corresponds to III (since the vectors become longer as $x \to 0$ and become "more horizontal" as $x \to \infty$).

16.2:

20. 64