

MATH 2043: RECOMMENDED HOMEWORK PROBLEMS

Text: Jon Rogawski, *Calculus: Early Transcendentals*, First Edition, Freeman and Company

CHAPTER 12: VECTOR GEOMETRY

Section 12.1: 1-3, 5, 7, 9, 11, 15-17, 23, 24, 29, 31, 33-35, 37, 39, 40, 41, 45-47, 49-51.

Section 12.2: 1, 5, 7, 9-11, 13, 15, 19, 21, 23, 25, 26, 27, 29, 31, 33 (in Problems 27-33 also find parametric equations of the line), 39, 45

Section 12.3: 1, 3, 5, 9, 11, 13-15, 17, 19, 21, 25, 29, 30, 32, 41, 43, 45, 49, 51, 60, 61

Section 12.4: 11-19 odd, 20, 34, 38, 40-43, 45, 47, 48

Section 12.5: 1, 3, 5, 9, 11-13, 15, 17, 21-23, 25-27, 29, 30-33

CHAPTER 13: CALCULUS OF VECTOR-VALUED FUNCTIONS

Section 13.2: 1, 3, 4, 7, 9, 10, 11, 13-15, 17, 33, 34, 35, 37, 40-44, 46-50, 51, 53

Section 13.3: 1, 3, 4, 6, 7, 9, 10, 13, 19 (in Problem 19, instead of finding arc length parametrization compute the length of the curve over the interval $0 \leq t \leq \ln 2$)

Section 13.5: 3-5, 8, 15-18

CHAPTER 14: DIFFERENTIATION IN SEVERAL VARIABLES

Section 14.1: 1, 4-7, 9, 11, 15, 20, 31, 32, 35-37, 39-41, 43, 44

Section 14.2: 3, 5, 7, 12, 13, 16, 23, 32, 33, 34-36

Section 14.3: 2-4, 13, 14, 17, 19, 21-23, 25, 27-29, 34, 35, 37, 40, 41, 43, 45, 53, 55, 58, 61, 63, 67, 68, 69

Section 14.4: 1, 3, 4, 6, 8, 9, 10, 11, 13, 15, 18, 20, 24, 25, 27, 29

Section 14.5: 1-3, 5-8, 11-19 odd, 21-25 odd, 26, 29, 30 (in Problems 21-30 also find the direction and rate of maximum increase at the given point), 32, 33, 34, 35, 37, 39, 41, 43

Section 14.6: 1, 3, 5, 7, 11, 13, 15

Section 14.7: 1-3, 5-8, 9, 11, 12, 13, 15, 19

Section 14.8: 1, 2, 4-7, 9, 11, 15, 19, 30

CHAPTER 15: MULTIPLE INTEGRATION

Section 15.1: 19, 23, 25-31, 35, 37, 38, 39, 41 (in Problems 38-41 us Eq. (3))

Section 15.2: 3, 4, 5-7, 9, 11, 15, 17-29 odd, 30, 31-34, 37-41, 47, 49, 53-55

Section 15.3: 3, 5, 11-14, 17, 18, 20, 23, 25, 28 (in Problem 28, set up the three iterated integrals; do not evaluate)

Section 15.4: 1, 3, 5-9, 13, 15, 17, 18, 21, 25,30, 31-35, 39-41, 46, 47, 49, 51-55, 59

Convert into spherical coordinates and evaluate $\int_{-2}^2 \int_0^{\sqrt{4-x^2}} \int_0^{\sqrt{4-x^2-y^2}} z \sqrt{x^2 + y^2 + z^2} dz dy dx$.

Evaluate $\int \int_D \int e^{-(x^2+y^2+z^2)^{3/2}} dV$ where D is the region that lies below the sphere $x^2 + y^2 + z^2 = 4$ and above the cone $z = \sqrt{x^2 + y^2}$.

CHAPTER 16: LINE AND SURFACE INTEGRALS

Section 16.1: 1, 3, 11, 15, 17, 23

Section 16.2: 1, 3, 5, 7, 13, 17-27 odd, 28-30, 38, 39, 48, 49

Section 16.3: 1, 2, 3, 7, 8, 9, 13, 14, 15, 18, 19, 22

For each vector field \mathbf{F} and a path \mathbf{c} below verify that \mathbf{F} is conservative, find a potential function, and evaluate $\int_{\mathbf{c}} \mathbf{F} \cdot d\mathbf{s}$

(a) $\mathbf{F} = \langle ye^{xy} - y^2, xe^{xy} - 2xy + \sin y \rangle$, $\mathbf{c}(t)$ is the straight line segment from the point $(1, 0)$ to the point $(0, \pi/2)$.

(b) $\mathbf{F} = \langle 2xyz, x^2z + \frac{z}{y^2}, x^2y - \frac{1}{y} + 2 \rangle$, $\mathbf{c}(t) = \langle \sqrt{2t+1}, e^{t^2-t}, \cos(\pi t) \rangle$, $0 \leq t \leq 1$.

CHAPTER 17: FUNDAMENTAL THEOREMS OF VECTOR ANALYSIS

Section: 17.1, 1-7, 9-11, 22, 23