MATH 2043: RECOMMENDED HOMEWORK PROBLEMS

Text: Jon Rogawski, *Calculus: Early Transcendentals*, SECOND 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, 42, 43, 45, 46, 48.

Section 12.2: 1, 5, 7, 9-11, 13, 15, 19, 21, 27, 28, 29, 31, 33, 35 (in Problems 29-35 also find parametric equations of the line), 47

Section 12.3: 1, 3, 5, 9, 11, 13, 14, 19, 21, 25, 29, 30, 33, 49, 50, 53, 54, 55, 63,

Section 12.4: 9, 11, 13, 15, 16, 30, 34, 36, 37, 38, 39, 41, 43 44, 47, 48

Section 12.5: 1, 3, 5, 13, 17-19, 21-23, 26, 28, 29, 31, 33, 34, 35, 36

CHAPTER 13: CALCULUS OF VECTOR-VALUED FUNCTIONS

Section 13.2: 1, 3, 4, 7, 9, 10, 12, 13, 15, 30, 31, 33, 34, 40, 41, 42, 43, 45, 47, 48, 49, 50, 51, 54

Section 13.3: 1, 3, 4, 7, 10, 11, 14, 24(in Problem 24, 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, 15-18

CHAPTER 14: DIFFERENTIATION IN SEVERAL VARIABLES

Section 14.1: 1, 4-7, 10, 19, 27, 28, 29, 30, 32, 34, 35

Section 14.2: 3, 4, 5, 13, 15, 23, 24, 33

Section 14.3: 2-4, 14, 15, 18, 20, 22, 23, 24, 25, 29, 30, 31, 37, 38, 41, 44, 51, 57, 58, 60, 63, 65, 68, 70, 71

Section 14.4: 3, 5, 7, 13, 16, 18, 20, 21, 22, 23, 25, 27

Section 14.5: 1-2, 4, 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, 35, 36, 38, 40, 42, 44

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

Section 14.7: 1-3, 7, 8, 10, 11, 13, 14, 15, 16, 21

Section 14.8: 1, 2, 4-7, 9, 11, 15, 20, 33

CHAPTER 15: MULTIPLE INTEGRATION

Section 15.1: 19, 27, 29, 30, 31, 32, 36, 37, 38, 40, 41, 42,

Section 15.2: 3, 4, 5-7, 9, 10, 14, 17-23 odd, 25-28, 33-36, 39, 41, 53, 46

Section 15.3: 2, 3, 9-14, 16, 20, 24, 28 (in Problem 28, set up the three iterated integrals; do not evaluate)

Section 15.4: 1, 3, 5, 6, 7, 9, 10, 11, 15, 19, 21, 22, 26, 27-31, 34-36, 41-45, 47, 48, 49 Extra exercises:
1. Convert into spherical coordinates and evaluate

$$\int_{-2}^{2}\int_{0}^{\sqrt{4-x^2}}\int_{0}^{\sqrt{4-x^2-y^2}} z\sqrt{x^2+y^2+z^2}\,dzdydx$$

2. 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, 7, 14, 16, 24

Section 16.2: 1, 3, 5, 7, 9-15 odd, 20-22, 35, 36, 41, 51, 52

Section 16.3: 1, 3, 5, 8, 9, 10, 21, 22
Extra Exercise:
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) $\mathbf{F}=\langle 2xyz, x^2z+\frac{z}{y^2}, x^2y-\frac{1}{y}+2\rangle$, $\mathbf{c}(t)=\langle\sqrt{2t+1}, e^{t^2-t}, \cos(\pi t)\rangle$, $0\le t\le 1$.

CHAPTER 17: FUNDAMENTAL THEOREMS OF VECTOR ANALYSIS

Section: 17.1: 1-7, 9, 10, 12, 13