

MAT103

Mathematical Methods – I

Ajit Kumar (ajit.kumar@snu.edu.in)

& Teaching Assistants (TAs)

JAMES STEWART
ESSENTIAL CALCULUS
EARLY TRANSCENDENTALS



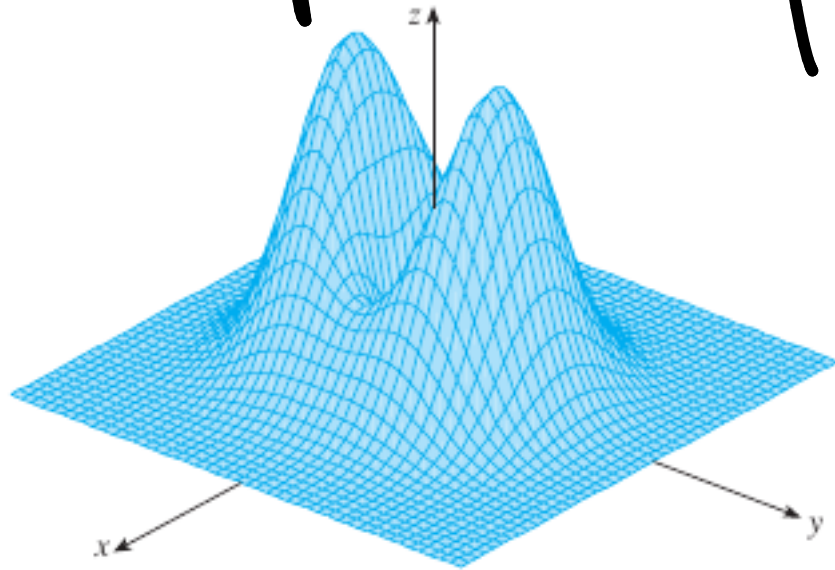
NEW! ENHANCED WebAssign EDITION

This value-priced edition includes access to Enhanced WebAssign, an easy-to-use online homework

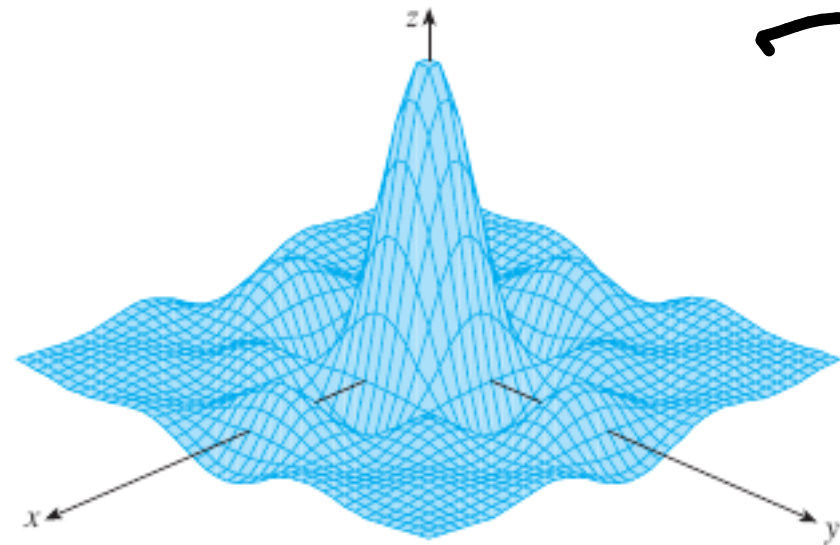
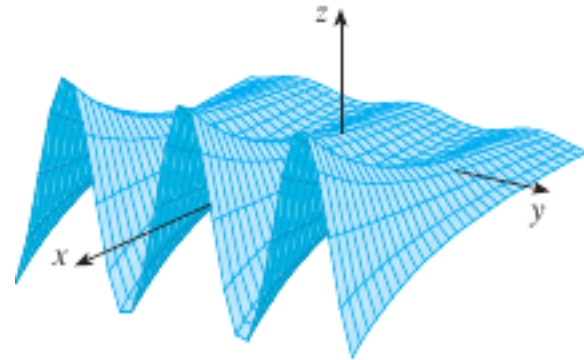
- ▶ 1 FUNCTIONS AND LIMITS
- ▶ 2 DERIVATIVES
- ▶ 3 INVERSE FUNCTIONS: Exponential, Logarithmic, a...
- ▶ 4 APPLICATIONS OF DIFFERENTIATION
- ▶ 5 INTEGRALS
- ▶ 6 TECHNIQUES OF INTEGRATION
- ▶ 7 APPLICATIONS OF INTEGRATION
- ▶ 8 SERIES
- ▶ 9 PARAMETRIC EQUATIONS AND POLAR COORDIN...
- ▶ 10 VECTORS AND THE GEOMETRY OF SPACE
- ▶ 11 PARTIAL DERIVATIVES
- ▶ 12 MULTIPLE INTEGRALS
- ▶ 13 VECTOR CALCULUS

Syllabus for
this Sem

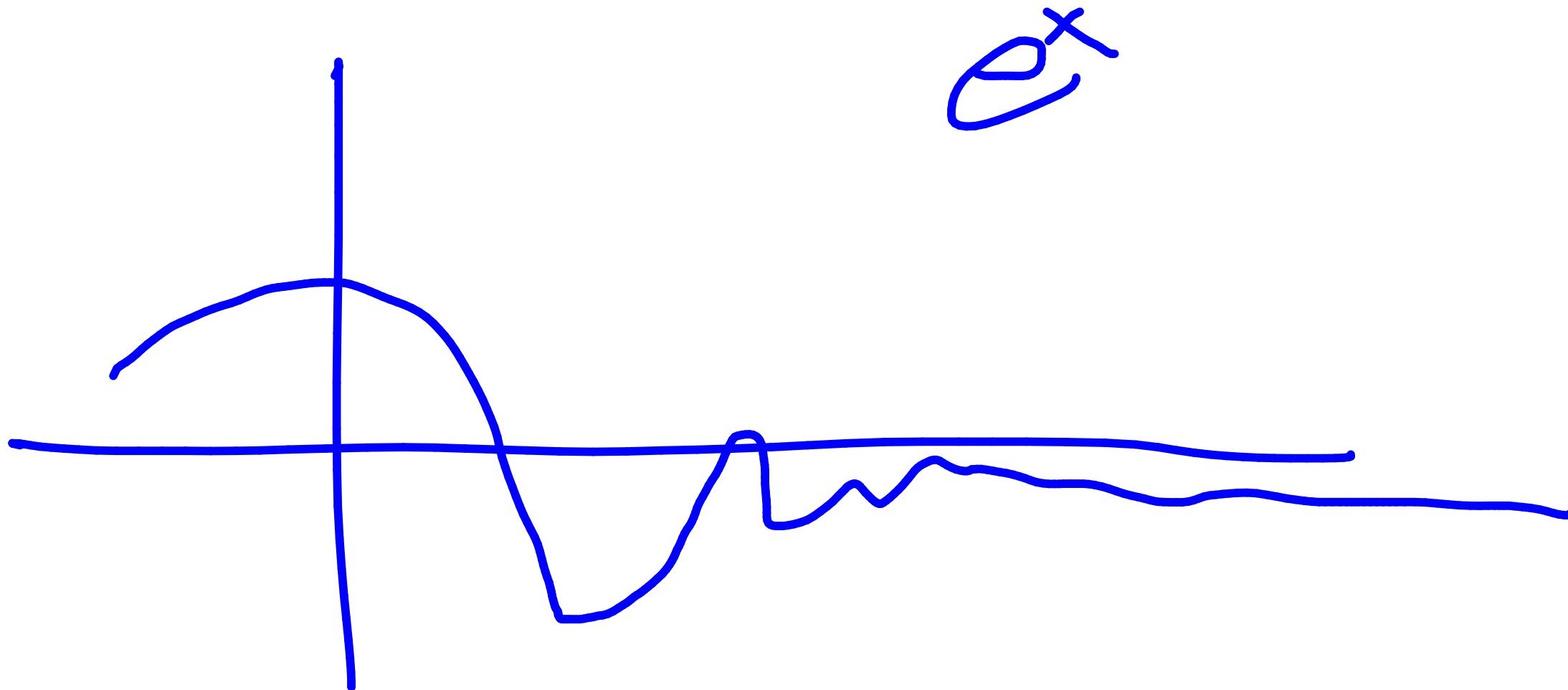
Graphs of multivariable fns.



(a) $f(x, y) = (x^2 + 3y^2)e^{-x^2-y^2}$

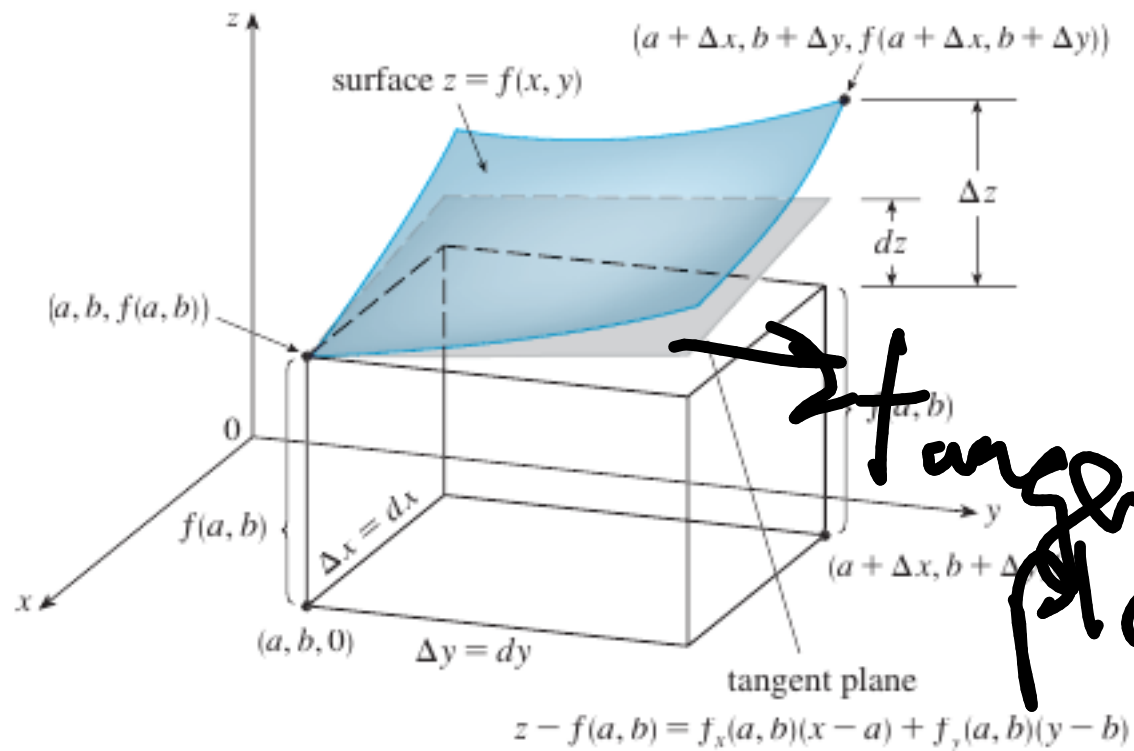


(d) $f(x, y) = \frac{\sin x \sin y}{xy}$

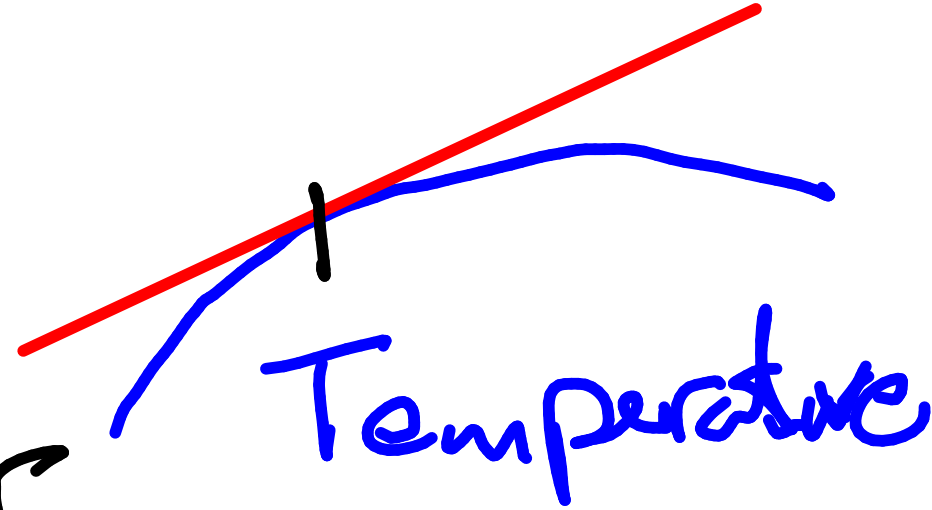


e^x

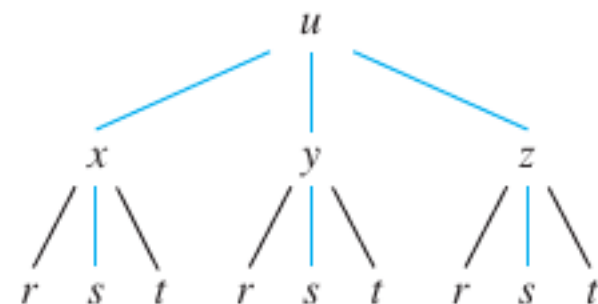
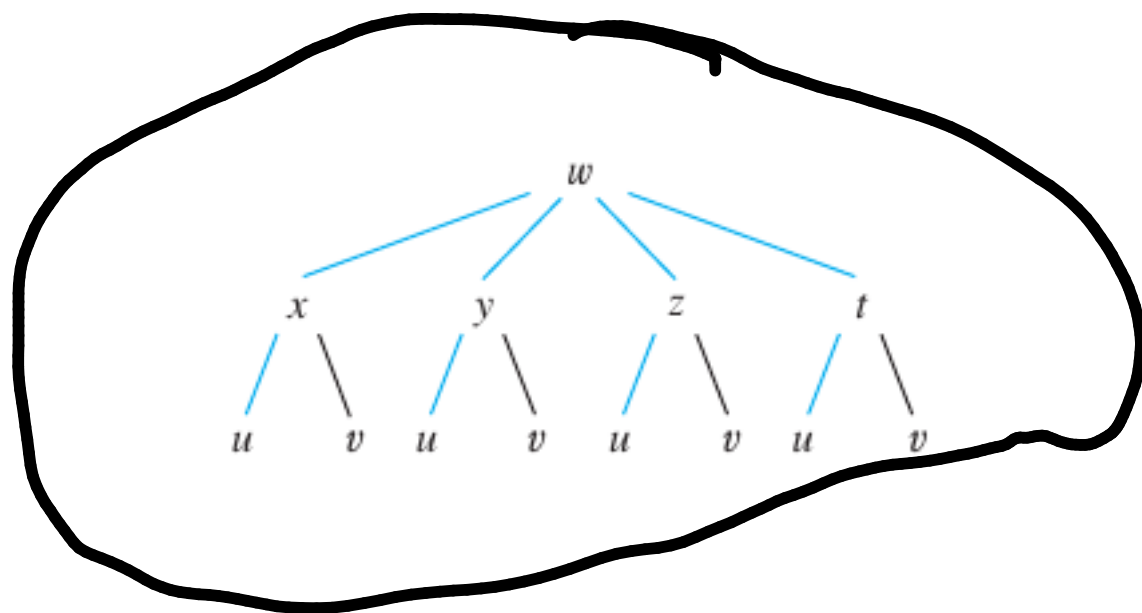
derivatives of $f(x, y)$

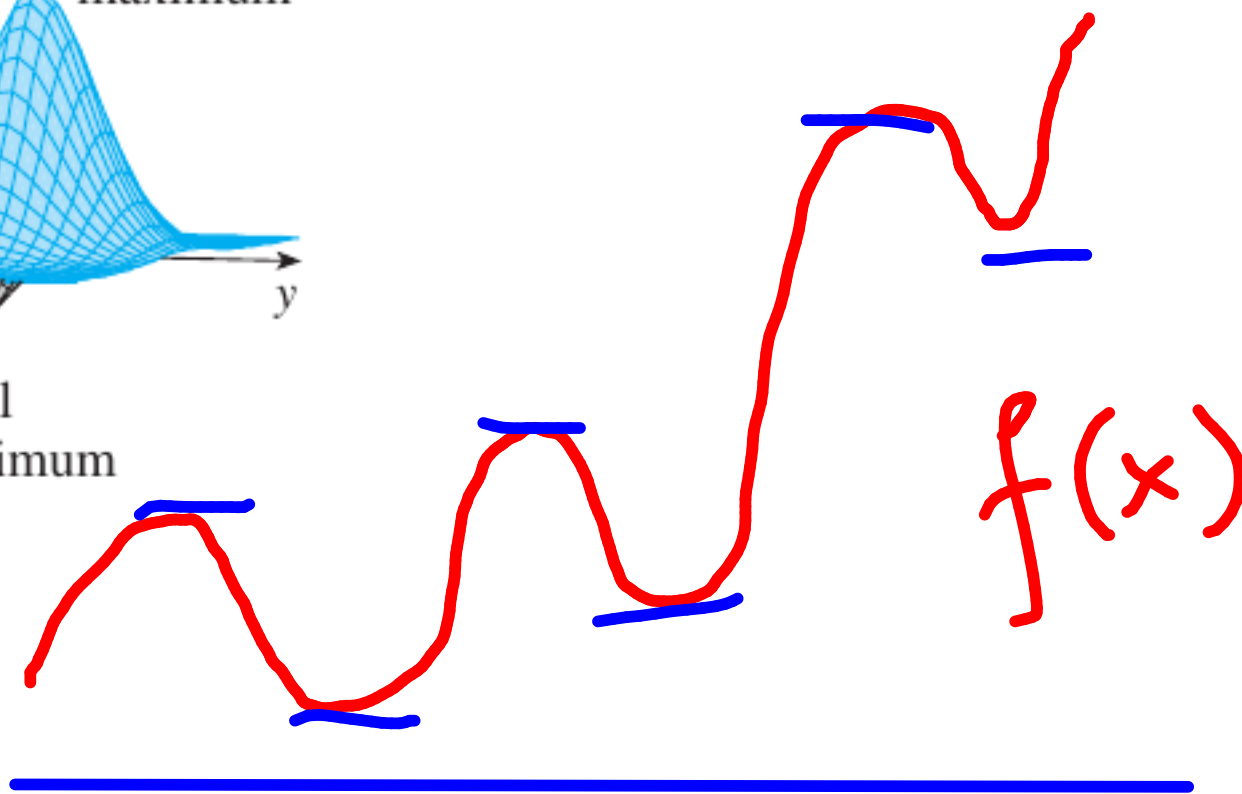
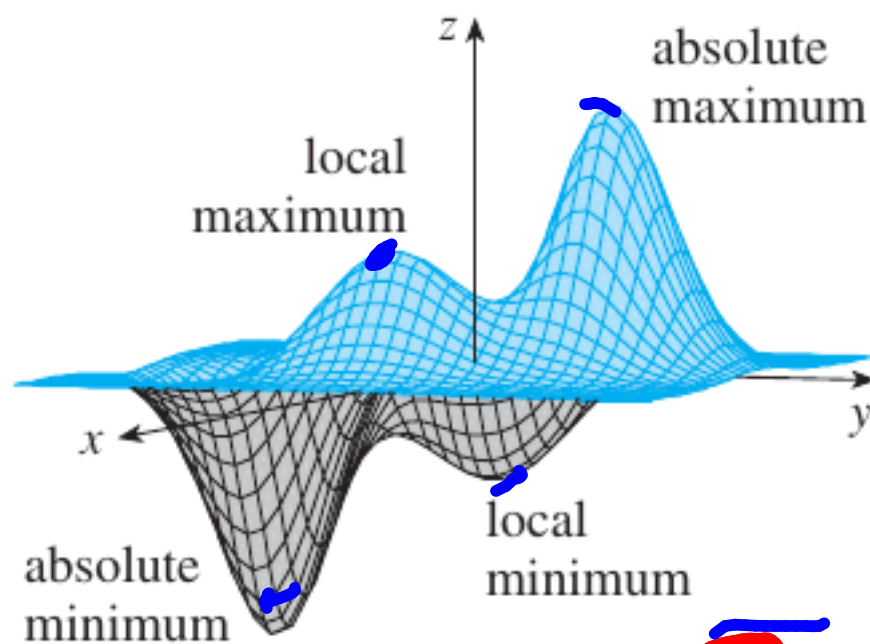


tangent plane

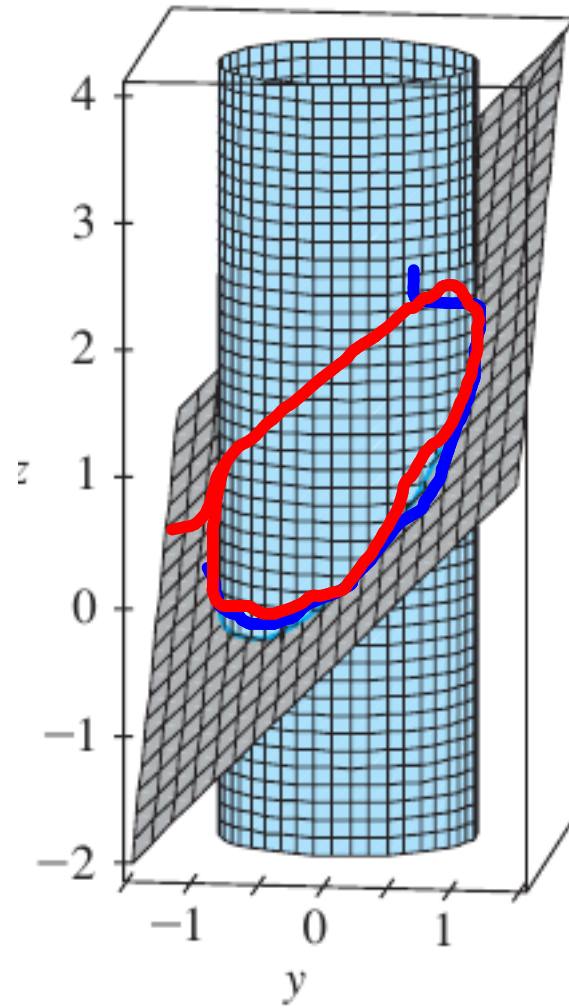


THE CHAIN RULE

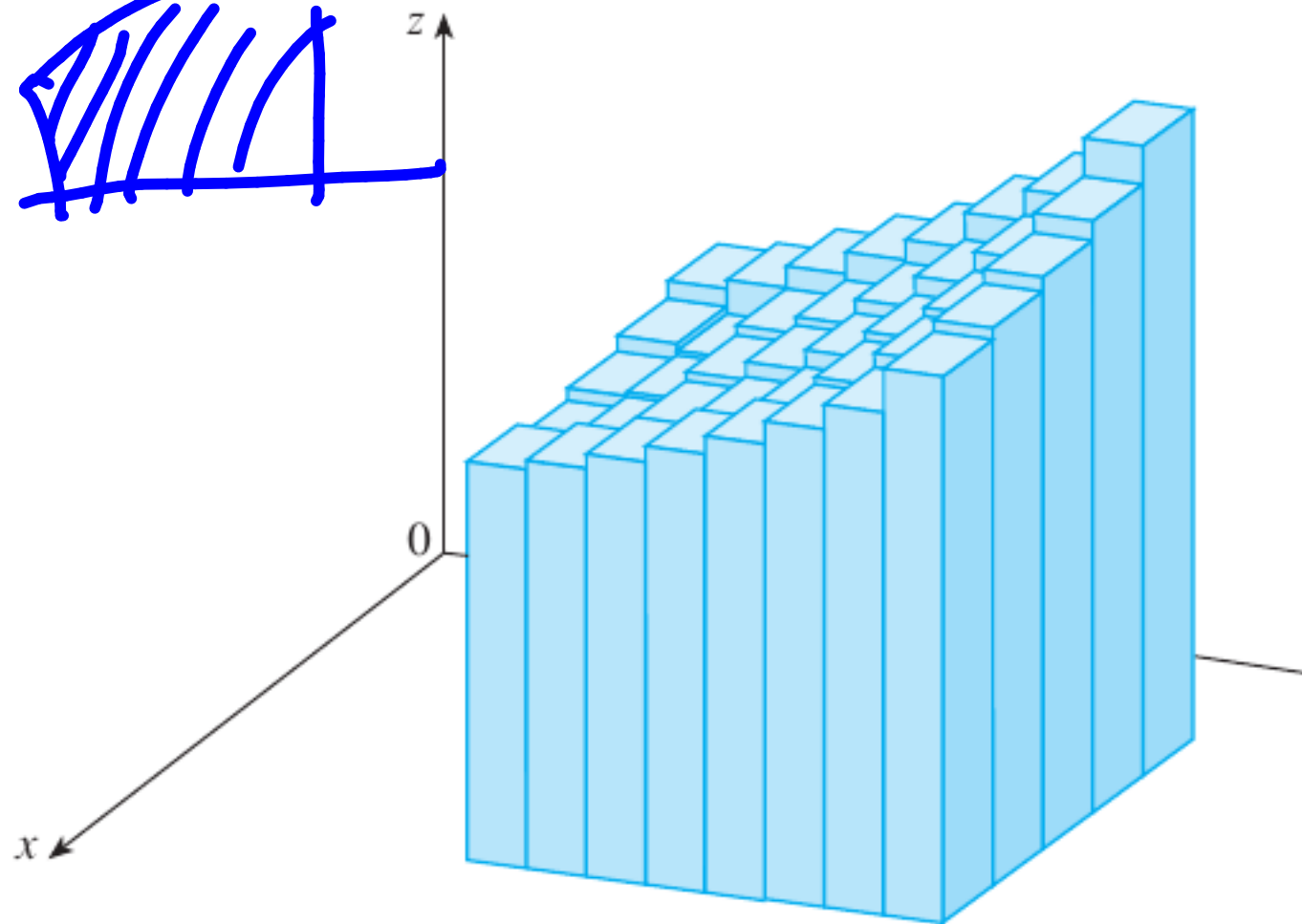
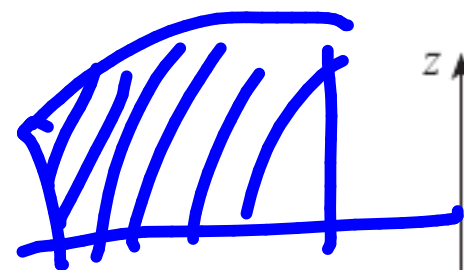
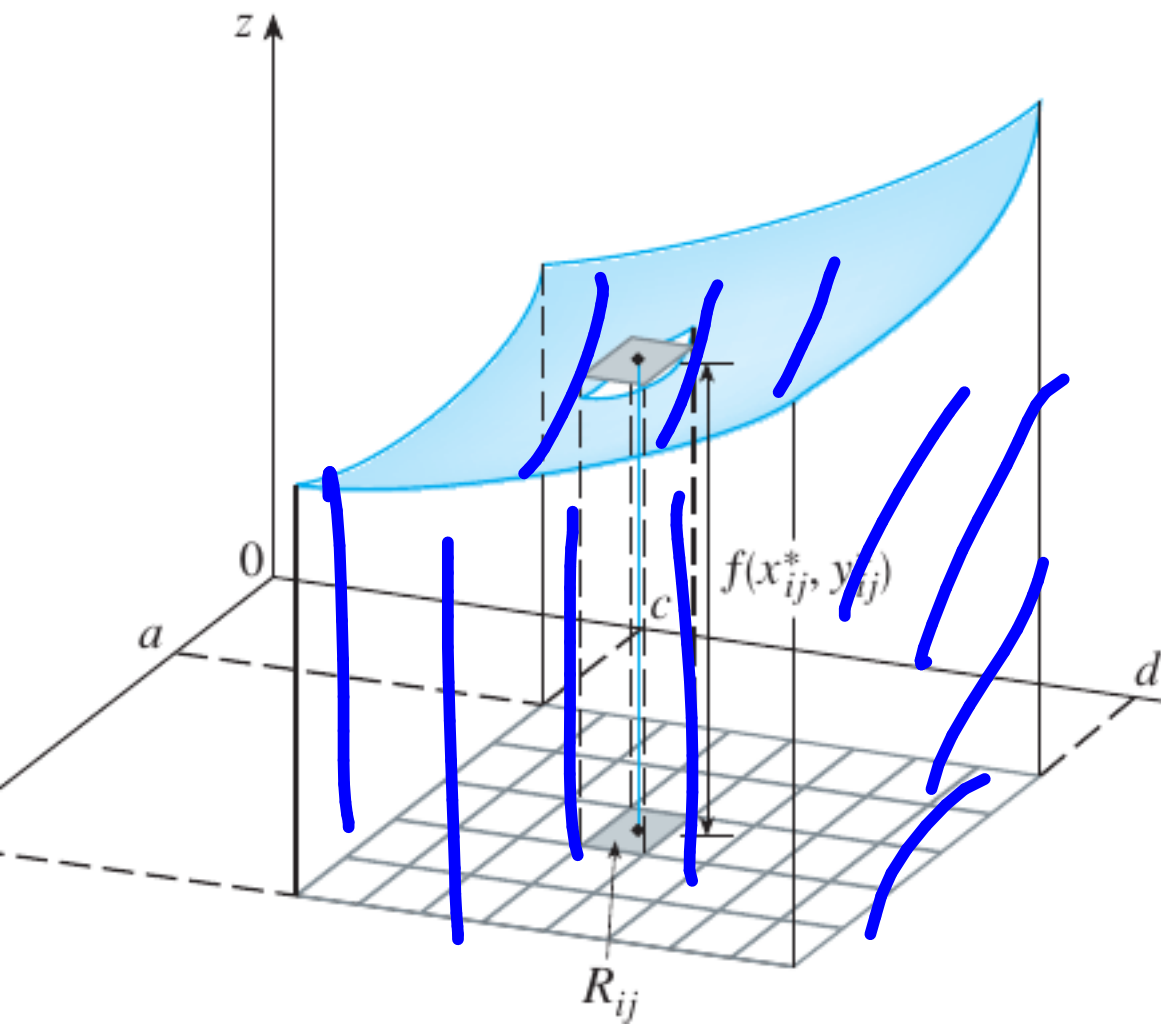


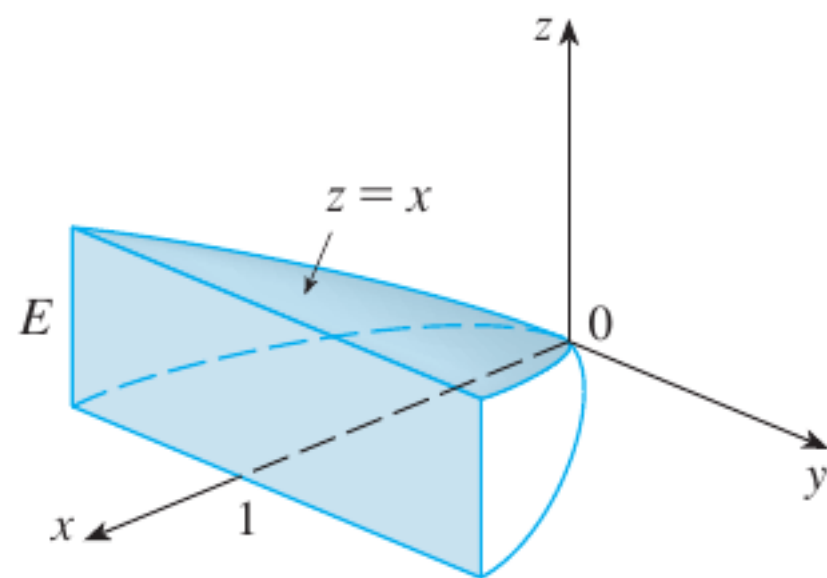
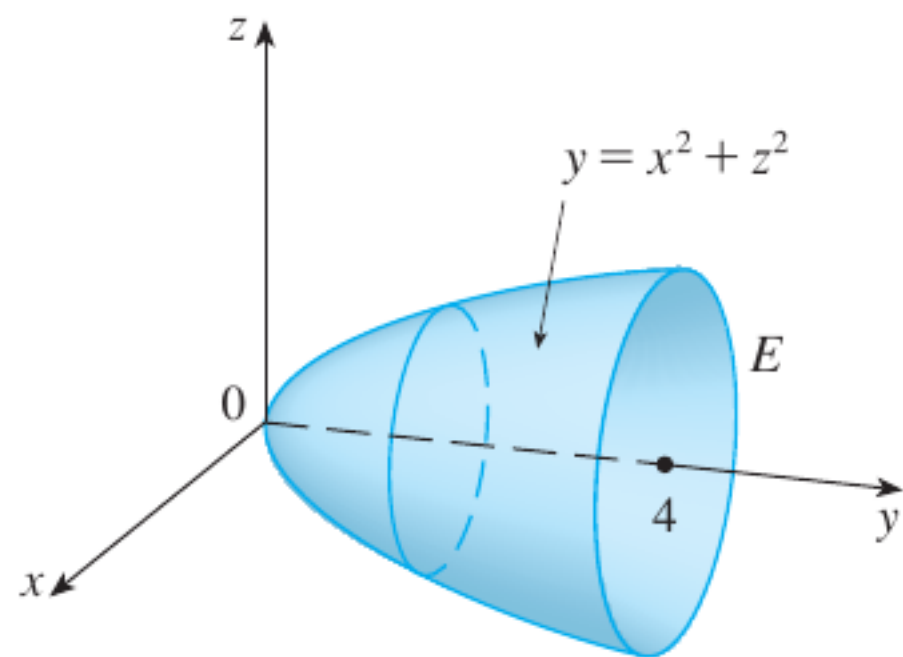


Lagrange multipliers

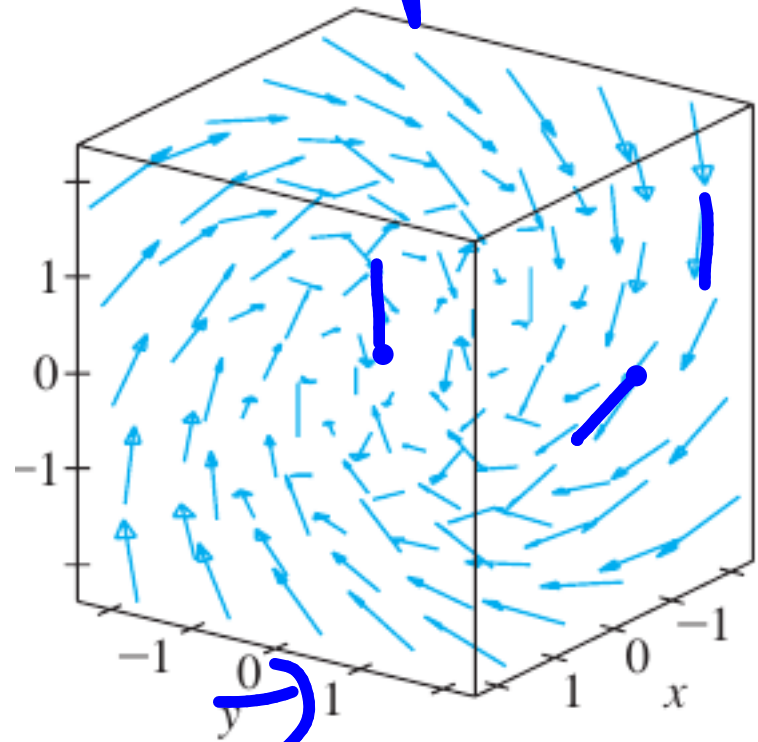


Chapter 12: Integration

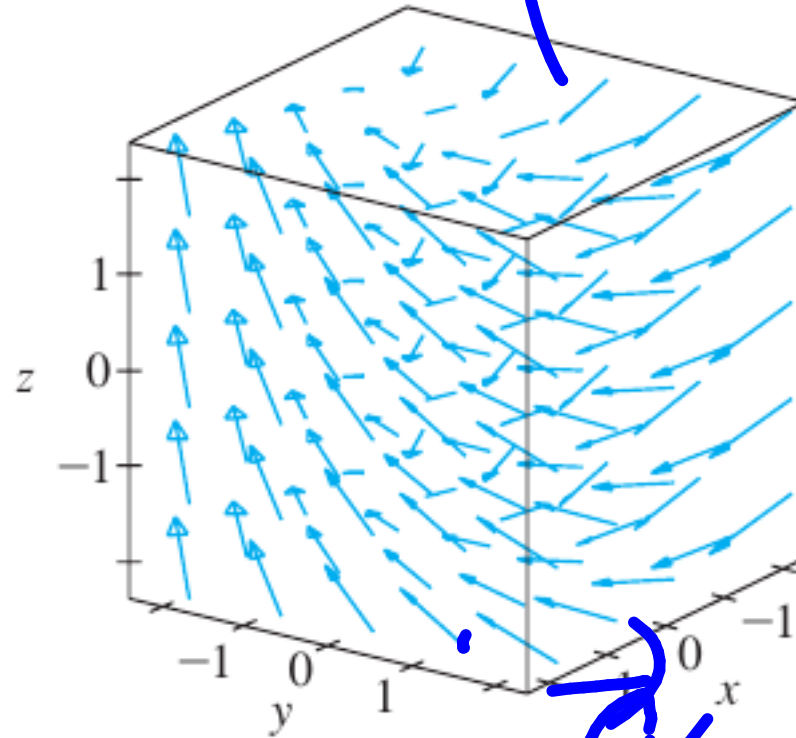




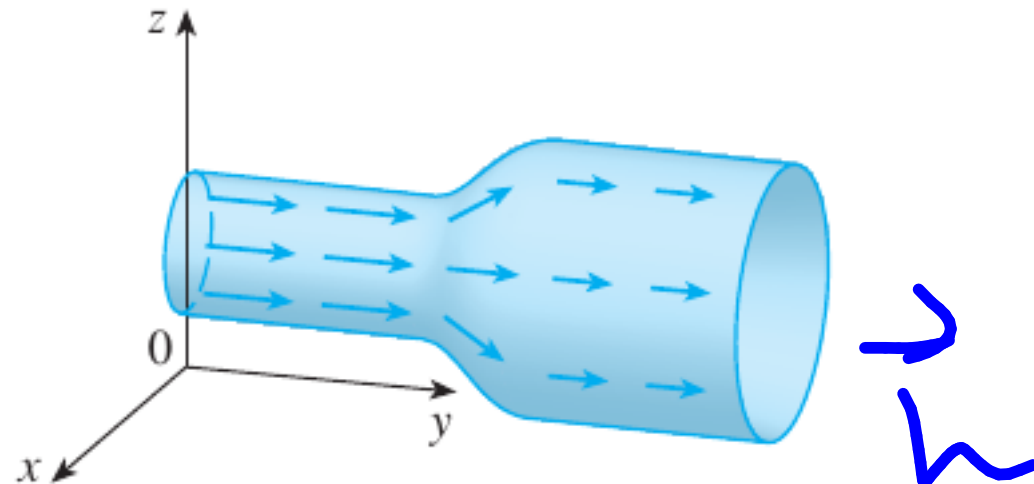
Chapter 13: Surfaces & Vector fields



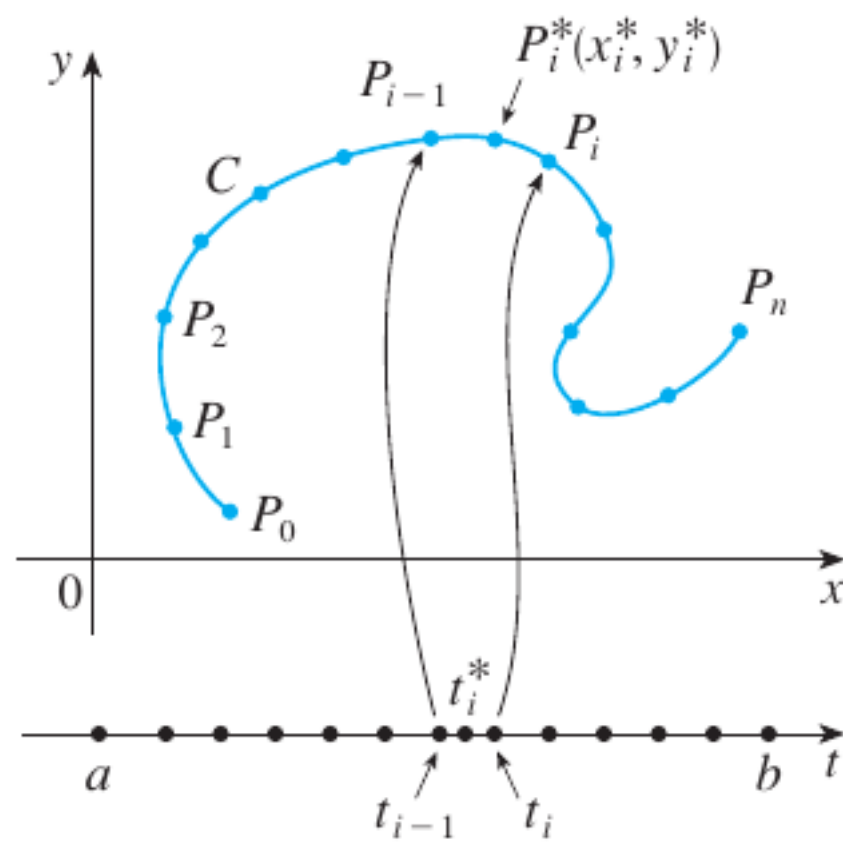
f



g

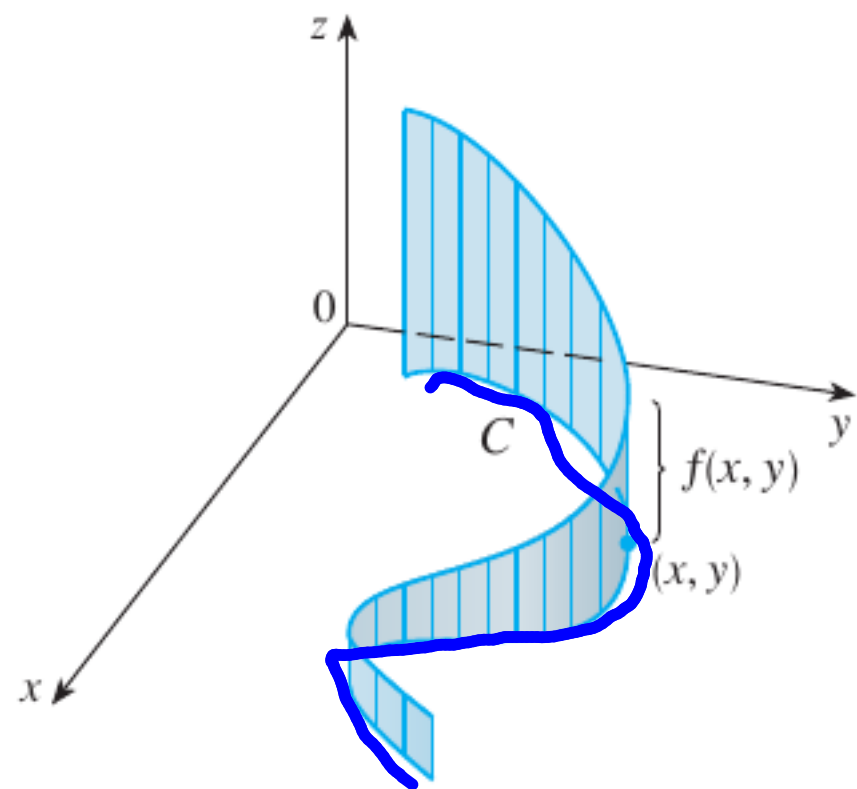


h

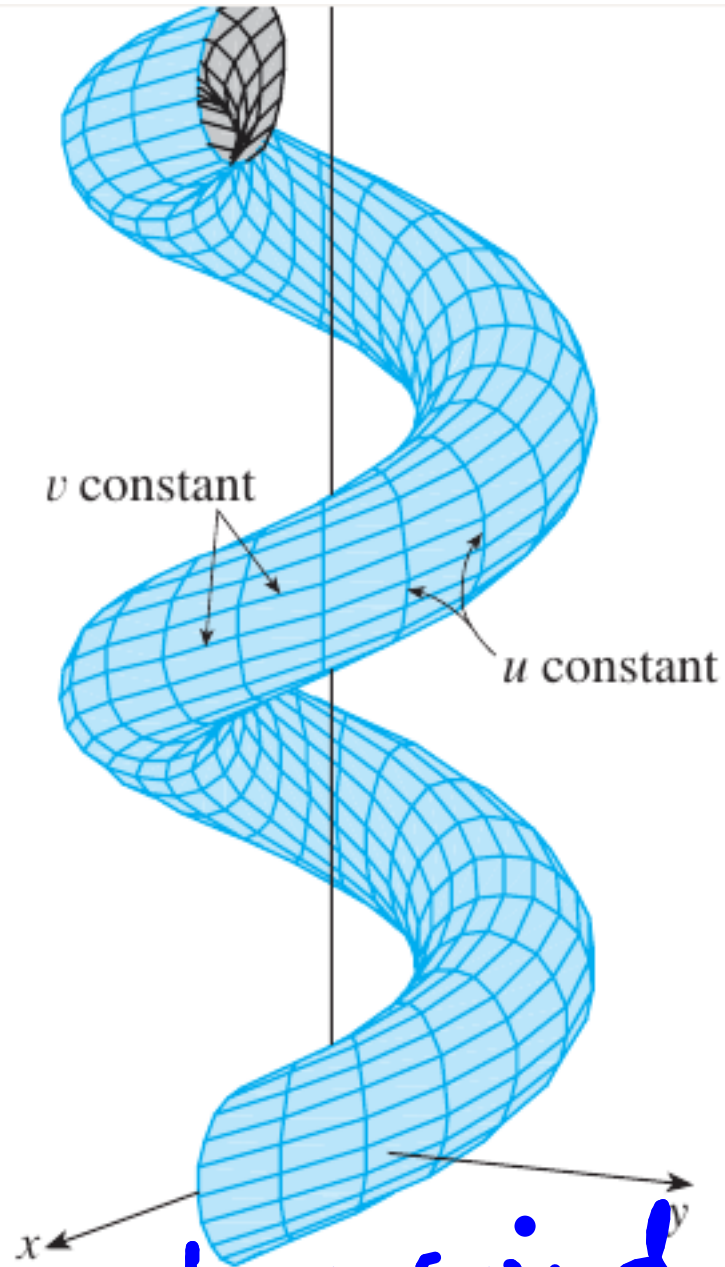


length of C

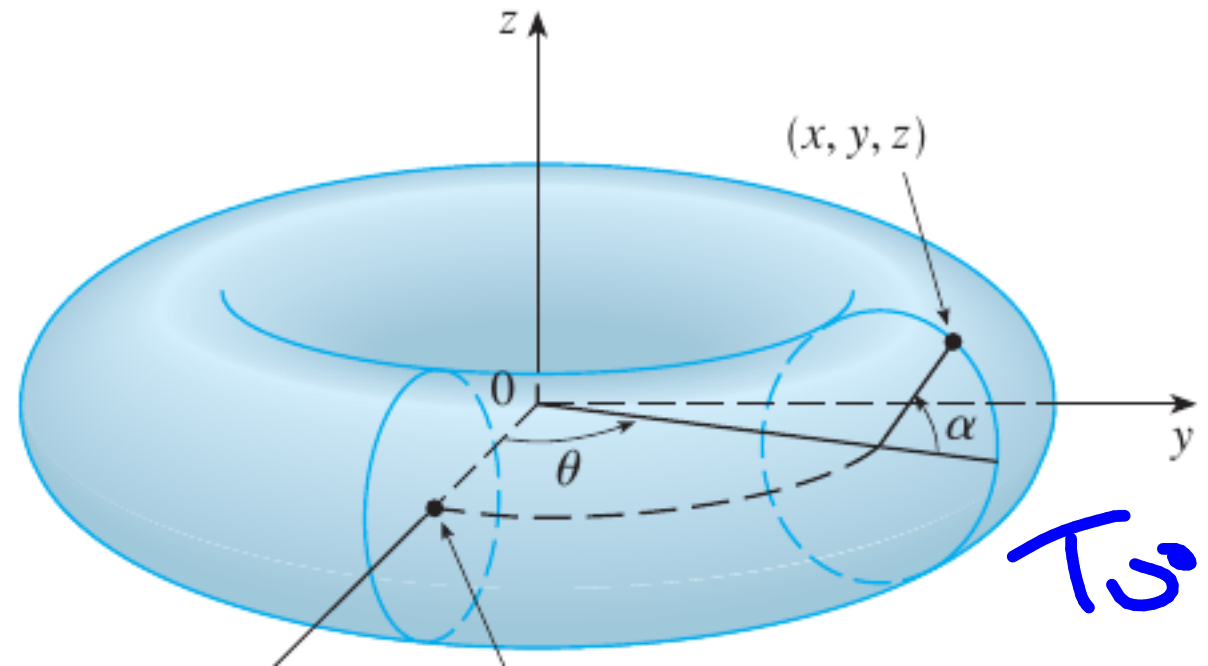
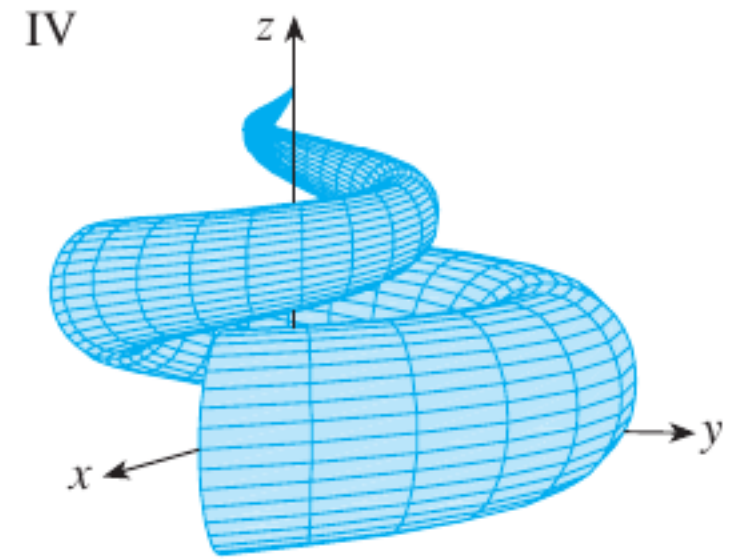
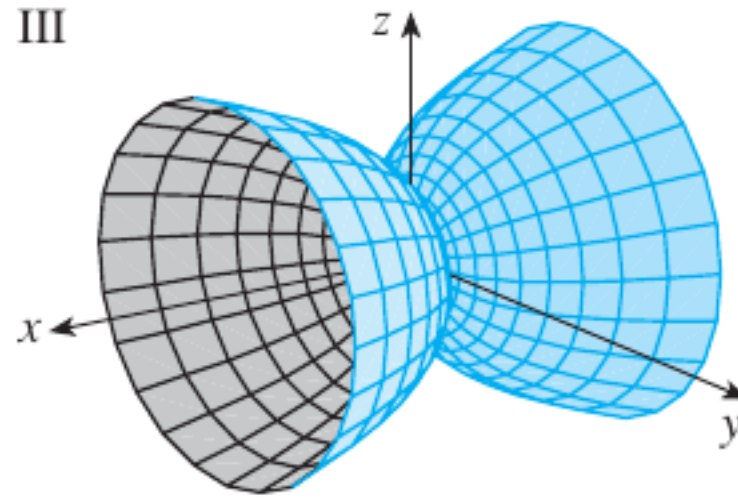
$$L = \int_a^b \sqrt{\left(\frac{dx}{dt}\right)^2 + \left(\frac{dy}{dt}\right)^2} dt$$



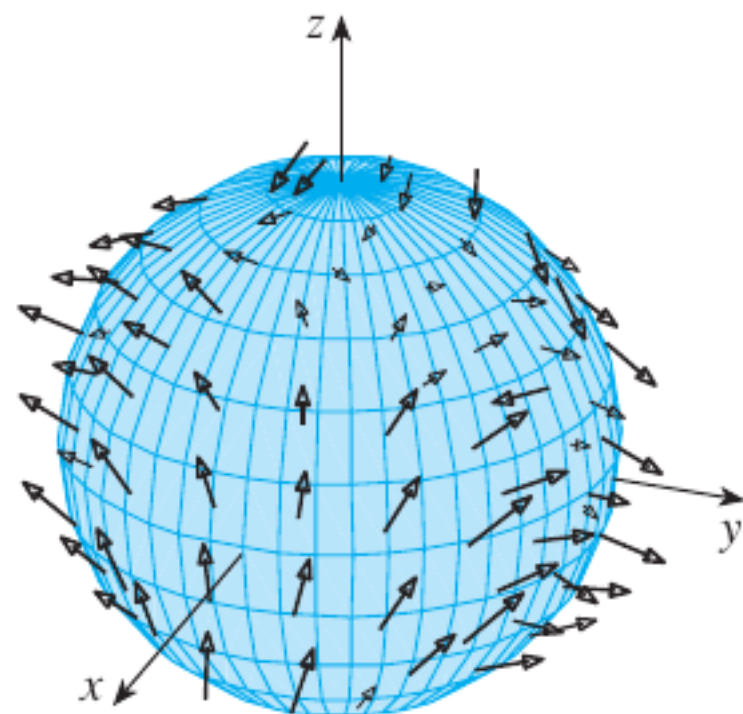
PARAMETRIC SURFACES



helicoid



Two us



11

PARTIAL DERIVATIVES

11.1

FUNCTIONS OF SEVERAL VARIABLES

EXAMPLE I Find the domains of the following functions and evaluate $f(3, 2)$.

(a) $f(x, y) = \frac{\sqrt{x + y + 1}}{x - 1}$

(b) $f(x, y) = x \ln(y^2 - x)$

EXAMPLE 2 Find the domain and range of $g(x, y) = \sqrt{9 - x^2 - y^2}$.

GRAPHS

DEFINITION If f is a function of two variables with domain D , then the **graph** of f is the set of all points (x, y, z) in \mathbb{R}^3 such that $z = f(x, y)$ and (x, y) is in D .

V EXAMPLE 4 Sketch the graph of $g(x, y) = \sqrt{9 - x^2 - y^2}$.

<https://www.geogebra.org/3d?lang=en>

(a) $f(x, y) = (x^2 + 3y^2)e^{-x^2-y^2}$

(d) $f(x, y) = \frac{\sin x \sin y}{xy}$

Read 11.1
→ solve problems
→ Play with
online tools
to plot graphs.