Study guide for quiz 05

Quiz problems include both the lecture contents and homework problems.

1. Section 14.3 and 14.5: Study equivalent forms of the error term of linear approxima-
tion for a differentiable function as mentioned in Problem 1 of Homework 07, and its
application in identifying differentiable functions as in problem 2 of Homework 08.

2. Section 14.4: Study the Chain rule for composition of differentiable functions of one
or more independent variables (along with one or more intermediate variables) such
as Theorem 5 (1 independent, 2 intermediate variables), Theorem 6 (1 independent, 3
intermediate variables), Theorem 7 (2 independent, 3 intermediate variables) and so
on for more general cases.

3. Section 14.4: Study how to evaluate

$$\frac{d}{dx} \int_{g_1(x)}^{g_2(x)} f(x, t) \, dt.$$

4. Section 14.5: Study the definition of directional derivative and how to compute it
from definition, and alternatively how to compute it using partial derivatives when the
function is differentiable.

5. Section 14.5: Study the geometric meaning of the gradient vector. Study how to find
the tangent line and normal line of a level curve of $f(x, y)$ (i.e., $\{(x, y) \mid f(x, y) = c\}$)
using gradient of f.