

READING ASSIGNMENT 03
§5.6 (Rate of change), §5.7 (Substitution)

NAME: _____
Due 28 June 2018

LEARNING OBJECTIVES

By the end of this lesson, you will be able to:

- use calculus to solve simple word problems and interpret the answer in the original context,
- compute definite and indefinite integrals using the substitution method.

REVIEW

- You may wish to review dimensional analysis. One resource is here:

<https://www.chem.tamu.edu/class/fyp/mathrev/mr-da.html>

READING

- Read section 5.6 in the textbook. Skip the “Total Versus Marginal Cost” subsection.
- Read section 5.7 in the textbook, or watch the YouTube video at the URL below.

<https://www.youtube.com/watch?v=IGgUAF1Va-A>

QUESTIONS

- (1) A hot metal object is submerged in cold water. The rate at which the object cools (in degrees per minute) is a function $f(t)$ of time. What quantity does $\int_0^T f(t) dt$ represent?

(2) Which of the following are naturally represented as derivatives, and which are naturally represented as integrals?

- (a) Velocity of a train
- (b) Rainfall during a six-month period
- (c) Mileage per gallon of a car
- (d) Increase in world population from 1800 to 1900

(3) Which of the following integrals are candidates for the substitution method?

- (a) $\int 5x^4 \sin(x^5) dx$
- (b) $\int \sin^5(x) \cos(x) dx$
- (c) $\int x^5 \sin(x) dx$
- (d) $\int \sin(x) \cos(x) dx$
- (e) $\int \sin(x^5) \cos(x) dx$