

Information on Math 5710.
Synopsis of topics on Riemann-Stieltjes integral.

Definition (Definition 29.2). Examples.

Cauchy criteria for integrability (Theorem 29.4)

Properties : bilinearity (Theorem 29.5), additivity (Theorem 29.6).

Integration by parts (Theorem 29.7).

Reduction to the Riemann integral (Theorem 29.8)

Riemann criteria for integrability (Theorem 30.1)

Integrability theorem (Theorem 30.2, Corollary 30.3, Theorem 30.4)

Integral inequalities (class notes). First mean-value theorem (Theorem 30.6).

Fundamental theorem of integral calculus (Theorem 30.8). Change of variables.

Homework problems: S.29 (page 222) # 29A, 29C, 29E, 29K, 29O, 30A, 30D, 30E, 30H, 30O, 30V (b)(c)(d)(f) .

Exam (Quizzes) problems - examples.

1. Let

$$f(x) = \begin{cases} +1, & \text{if } x > 0 \\ -1, & \text{if } x \leq 0 \end{cases}$$

Find $F(x) = \int_0^x f(t)dt$ (explain why f is Riemann integrable). Is function F differentiable everywhere?

2. Let function f be monotone and g be continuous. Is function f is integrable with respect to g ? (explain by citing appropriate theorems).

3. Find integrals

$$\int_{-1}^1 x^3 d|x| =$$

$$\int_0^\pi d(x + [x]) =$$