

Math 21B
 Kouba
 Challenge Sheet 2

1.) Convert $\lim_{n \rightarrow \infty} \sum_{i=1}^n \left(2 + \frac{3i}{n}\right) \frac{1}{n}$ to a definite integral and then evaluate it using the Fundamental Theorem of Calculus. Choose the general sampling point to be

a.) $c_i = \frac{i}{n}$ b.) $c_i = \frac{3i}{n}$ c.) $c_i = 2 + \frac{3i}{n}$

2.) Assume that f is an even function and $\int_0^4 f(x) dx = 5$. Evaluate

a.) $\int_{-4}^4 3f(x) dx$ b.) $\int_0^{-4} (2 - f(x)) dx$

3.) Assume that f is an odd function and $\int_0^2 f(x) dx = -4$. Evaluate

a.) $\int_{-2}^0 (5 + f(x)) dx$ b.) $\int_{-1}^1 (f(x))^3 dx$

4.) Determine the x -values for all relative maxima and minima on the interval $[-3, 2]$ for the following function :

$$F(x) = \int_{-1}^x t(t-1)^5(t+2)^2 dt$$

5.) Use the limit definition of a definite integral to evaluate $\int_0^1 10^x dx$.

6.) Use any method to evaluate the following definite integral :

$$\int_1^{(1/3) \log 1000} \sin^3 x \cdot \cos^2(2x) dx$$

7.) Assume that lengths A and B and angle α are given. Determine the value of the circle's radius r in terms of A , B , and α .

