Math 132: Discussion Session: Week 2

Directions: In groups of 3-4 students, work the problems on the following page. Below, list the members of your group and your answers to the specified questions. Turn **this paper** in at the end of class. You do not need to turn in the question page or your work.

Additional Instructions: It is okay if you do not completely finish all of the problems. Also, each group member should work through each problem, as similar problems may appear on the exam.

Scoring:

Correct answers	Grade
0–3	0%
4–6	80%
7–14	100%

Group Members:

5.1–5.2: Riemann Sums and Limits of Riemann Sums.

(1) $L_3 =$

(2) $M_5 =$

(3) (a) $R_6 =$

(b) $R_6 = \sum_{i=1}^{6}$

(c) $R_{127} = \sum_{i=1}^{127}$

(d) $R_{127} =$

(e) $R_n = \sum_{i=1}^{n}$

(f) $R_n =$

(g) $\int_2^5 (5x^2 - 3)\,dx =$

(4) (a) $R_n = \sum_{i=1}^{n}$

(b) $R_n =$

(c) $\int_0^2 (x^3 - 2x)\,dx =$

5.2: Definite Integrals as Signed Area

(1) $\int_0^2 \sqrt{16 - 4x^2}dx =$

(2) $\int_{-2}^5 \Big(4 + x - 2|x|\Big)dx =$

Math 132 Discussion Session: Week 2

5.1–5.2: Riemann Sums and Limits of Riemann Sums. Useful formulas:

$$\sum_{i=1}^{n} 1 = n, \qquad \sum_{i=1}^{n} i = \frac{n(n+1)}{2}, \qquad \sum_{i=1}^{n} i^2 = \frac{n(n+1)(2n+1)}{6}, \qquad \sum_{i=1}^{n} i^3 = \frac{n^2(n+1)^2}{4}.$$

(1) Let $f(x) = \sin^2(x)$. Compute the Riemann sum L_3 with three intervals, sampling at left endpoints, on $[\frac{\pi}{6}, \frac{5\pi}{12}]$.

(2) Let $f(x) = \ln(2x)$. Compute the Riemann sum M_5 with five intervals, sampling at midpoints, on $[1, 3]$.

(3) Let $f(x) = 5x^2 - 3$ on $[2, 5]$.

(a) Compute the Riemann sum R_6 with six intervals, sampling at right endpoints.

(b) Write down an expression for R_6 using $\sum_{i=1}^{6}$ notation. The only variable in your final answer should be i.

(c) Write down an expression for R_{127} using $\sum_{i=1}^{127}$ notation. The only variable in your final answer should be i.

(d) Use the formulas at the top of the page to write down an expression for R_{127}. You don't need to simplify, but there should be no variables or summations in your final answer.

(e) Write down an expression for R_n using $\sum_{i=1}^{n}$ notation. The only variables in your final answer should be i and n.

(f) Use the formulas at the top of the page to write down an expression for R_n. There should be no summations in your final answer, and the only variable in your answer should be n.

(g) Compute the definite integral $\displaystyle\int_2^5 (5x^2 - 3)\,dx$ by computing $\lim_{n\to\infty} R_n$.

(h) Compute the definite integral $\displaystyle\int_2^5 (5x^2 - 3)\,dx$ by computing the antiderivative of $5x^2 - 3$.

(4) Let $f(x) = x^3 - 2x$ on $[0, 2]$.

(a) Write down an expression for R_n using $\sum_{i=1}^{n}$ notation. The only variables in your final answer should be i and n.

(b) Use the formulas at the top of the page to write down an expression for R_n. There should be no summations in your final answer, and the only variable in your answer should be n.

(c) Compute the definite integral $\displaystyle\int_0^2 (x^3 - 2x)\,dx$ by computing $\lim_{n\to\infty} R_n$.

(d) Compute the definite integral $\displaystyle\int_0^2 (x^3 - 2x)\,dx$ by computing the antiderivative of $x^3 - 2x$.

5.2: Definite Integrals as Signed Area. Compute the following definite integrals by interpreting them as areas

(1) $\displaystyle\int_0^2 \sqrt{16 - 4x^2}\,dx$

(2) $\displaystyle\int_{-2}^{5} \Big(4 + x - 2\,|x|\Big)\,dx$. Hint: Consider $x < 0$ and $x > 0$ separately to draw the graph of this function.