

MATH 10B – Calculus II

Homework 2

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1. Suppose that

$$\sum_{k=1}^{100} a_k = 15, \quad \sum_{k=1}^{100} b_k = -12.$$

Use this to compute the following sums.

(a) $\sum_{k=1}^{100} (a_k - b_k).$

(b) $\sum_{k=1}^{100} (3a_k - 4b_k).$

2. Express the following left/right Riemann sums as summations, but do not evaluate.

(a) L_{10} for $f(x) = \sqrt{4 - x^2}$ on $[-2, 2]$.

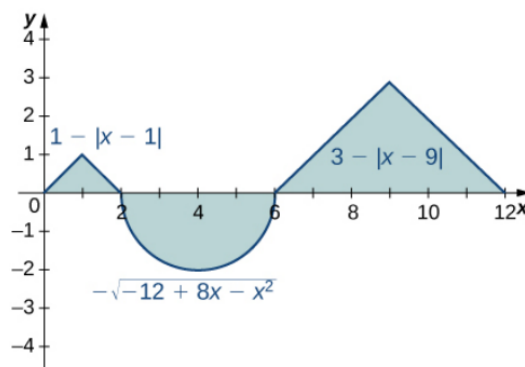
(b) R_{100} for $g(x) = \ln(x)$ on $[1, e]$.

3. Express the limit of

$$L_n = \frac{2\pi}{n} \sum_{i=1}^n 2\pi \frac{i-1}{n} \cos\left(2\pi \frac{i-1}{n}\right)$$

as $n \rightarrow \infty$ as an integral.

4. Evaluate the integral of the function graphed using the formulas for areas of triangles and circles, and subtracting the areas below the x -axis.



5. You are given that

$$\int_0^1 1 \, dx = 1, \quad \int_0^1 x \, dx = \frac{1}{2}, \quad \int_0^1 x^2 \, dx = \frac{1}{3}, \quad \int_0^1 x^3 \, dx = \frac{1}{4}.$$

Using this, compute the following integrals.

(a) $\int_0^1 (1 - x)^2 \, dx.$

(b) $\int_0^1 (1 - 2x)^3 \, dx.$

(c) $\int_0^1 6x - \frac{4}{3}x^2 \, dx.$