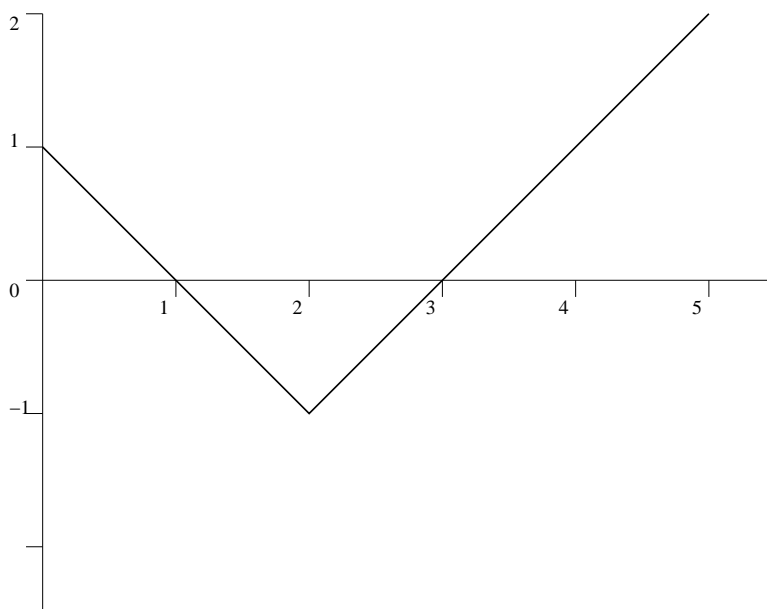


Mathematics 152.02
Review for Midterm 1

1. (a) Suppose that $f(x)$ is an even function and that $\int_0^4 f(x)dx = 6$, and that $\int_{-2}^2 f(x)dx = 2$. Find $\int_2^4 f(x)dx$.
(b) Suppose that $g(x)$ is an odd function and that $\int_0^4 g(x)dx = 3$, and $\int_0^2 g(x)dx = 1$. Find $\int_{-2}^4 g(x)dx$.
2. Draw an area that represents the definite integral $\int_0^3 \sqrt{9-x^2} dx$. Hence evaluate this integral.
3. Suppose $f'(x)$ is given by the graph below, and that $f(0) = 1$. Complete the table of values for $f(x)$.

x	0	1	3	5
$f(x)$	1			



4. Find the following indefinite integrals.

(a) $\int \pi x^2 + \frac{1}{\pi x^2} dx$

(b) $\int \sqrt{x} - \frac{1}{x\sqrt{x}} dx$

(c) $\int e^t + e^3 dt$

(d) $\int \frac{2}{x} + \frac{x}{2} dx$

5. Write down the left and right Riemann sums for three equal intervals for the integral

$$\int_1^2 \frac{1}{x} dx.$$

Without using your calculator explain why

$$\frac{47}{60} \geq \ln(2) \geq \frac{37}{60}.$$

6. Use the Fundamental Theorem of Calculus to compute the following definite integrals.

(a) $\int_1^3 \frac{1}{t^2} dt$

(b) $\int_0^\pi (3 \sin x + x + 5) dx$

7. Find the derivative of $x \ln(x) - x$. Calculate $\int_2^3 \ln(x) dx$.

8. The average value of a function $f(x)$ for $1 \leq x \leq 5$ is equal to 7, and the average value of the same function $f(x)$ for $5 \leq x \leq 8$ is equal to 3. What is the average value of $f(x)$ for $1 \leq x \leq 8$?