

## Math 1300 Homework 4

Due July 31, 2023 at the beginning of class

Collaboration and use of external sources are permitted, but must be fully acknowledged and cited. You will get most out of the problems if you tackle them on your own. All writing must be done individually.

1. Suppose  $f(x)$  is an odd function defined on the real numbers. What is  $\int_{-1}^1 f(x) dx$ ? (Think about properties of the graph of the function.)
2. If  $\int_0^3 f(x) dx = 12$  and  $\int_0^6 f(x) dx = 42$ , find the value of  $\int_3^6 (2f(x) - 3) dx$ .
3. Find  $\int_1^3 (|x + 1| + |x - 2|) dx$ .
4. Find the value of  $\int_0^{\log 9} e^{x/2} dx$ .
5. Compute the following definite integrals:
  - (a)  $\int_1^{e^3} 3x^{-1} dx$ ;
  - (b)  $\int_0^4 \frac{5\sqrt{x^3}}{8} dx$ ;
  - (c)  $\int_0^{\log 2} 6e^{3x} dx$ .
6. Compute each indefinite integral:
  - (a)  $\int x^4 - \sin x dx$ ;
  - (b)  $\int \sec^2(5x) dx$ .
7. Recall  $\log x$  is a function whose derivative is  $\frac{1}{x}$ . Find a function whose derivative is  $\log(x)$ .
8. If  $\int_0^4 f(x) dx = 9$ , find  $\int_0^2 xf(x^2) dx$ .
9. Evaluate  $\int_0^\pi \frac{\sin x}{\sqrt{3+\cos x}} dx$ .
10. Find the value of  $\int_e^{e^2} \frac{(\log x)^2}{x} dx$ .