

MATH 152 Assignment 1, Fall 2022.

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WebAssign Exercises

4.9 Exercises 2, 5, 31, 52

5.1 Exercises 3, 26

5.2 Exercises 21, 34, 35, 43

5.3 Exercises 3, 9, 27, 55

Written Exercises

1 Differentiate the following functions of x :

(a) $3x^2 + 2x^{-1}$, (b) $\ln(1 - x^2) + xe^{-2x}$, (c) $\frac{\ln x}{x^2}$, (d) $3 \sin(2x) - \sqrt{x} \cos x$.

2 (Section 4.9) A car is travelling at velocity $v(t) = 30t(4 - t)$ kmph.

(a) What is the maximum velocity of the car on $0 \leq t \leq 4$?

(b) How far does the car travel on $0 \leq t \leq 4$?

Use a derivative to answer (a) and an antiderivative for (b).

3 (Sections 5.1)

(a) Estimate the area under the graph of $f(x) = 4 - x^2$ from $x = -1$ to $x = 2$ using three approximating rectangles of width 1 and right end points.

(b) Repeat part(a) using left endpoints.

(c) Repeat part(a) using midpoints.

(d) Which estimate is the most accurate?

4 (Section 5.1)

(a) Let $f(x) = 1 + x$ and A be the area under $f(x)$ between $x = 0$ and $x = 1$. What is A ?

(b) Give a formula for R_n , the area of n right rectangles, and evaluate $\lim_{n \rightarrow \infty} R_n$. Show your working.

5 (Section 5.2) If $\int_0^2 f(x)dx = 3$ and $\int_0^2 g(x)dx = 1$ calculate $\int_0^2 (3f(x) - 2g(x)) dx$.
See Properties of the Definite Integral.

6 (Section 5.3) Evaluate $\int_1^9 \frac{3}{\sqrt{z}} dz$ using the Fundamental Theorem of Calculus.

7 (Section 5.3) Express the area in question 3 as a definite integral then evaluate the definite integral using the Fundamental Theorem of Calculus.

8 (Section 5.3) Show that $\int_a^b f(x)g(x)dx \neq \left(\int_a^b f(x)dx\right) \left(\int_a^b g(x)dx\right)$ in general.

Hint: Consider $\int_0^1 x(1 - x)dx$.