

1. Evaluate the following integrals

$$(a) \int_{-1}^1 \frac{x + x^3 + x^5}{1 + x^2 + x^4} dx$$

$$(b) \int_1^2 \frac{x + 2}{\sqrt{x^2 + 4x}} dx$$

$$(c) \int \frac{\cos(1/x)}{x^2} dx$$

$$(d) \int_0^{2\pi} \frac{\sin x}{\sin x - \cos x} dx$$

$$(e) \int \cos(ax + b) dx, \text{ where } a, b \text{ are real numbers.}$$

$$(f) \int (ax + b)^n dx, \text{ where } a, b \text{ are real numbers, and } n \in \mathbb{R} \text{ with } n \neq -1.$$

$$(g) \int_1^4 \frac{1}{x^2} \sqrt{1 + \frac{1}{x}} dx$$

$$(h) \int_1^8 \sqrt[3]{x}(x - 1) dx$$

(i) $\int_3^{11} \frac{1}{\sqrt{2x+3}} dx$

2. Sketch the region enclosed by the given curves. Find the area of the region.

(a) $y = x + 1$, $y = 9 - x^2$, $x = -1$, $x = 2$

(b) $y = \cos x$, $y = 2 \sin(x) \cos(x)$, $x = 0$, $x = \pi/2$.

(c) $y = x^2$, $y = x^2 - x$, $x = 2$