

Review 3

1. Compute the following indefinite integrals

$$\begin{aligned} & \int (\cos x + \sqrt[3]{x}) dx, \\ & \int (3 \sin x + \frac{1}{\sqrt[3]{x}}) dx, \\ & \int x^2 (\sqrt{3x} + \frac{1}{\sqrt{3x}}) dx, \\ & \int \frac{x^3 + 2x^2 + 3x + 4}{x^2} dx. \end{aligned}$$

2. Compute the following indefinite integrals

$$\begin{aligned} & \int e^x \sin e^x dx, \\ & \int x^2 e^{x^3} dx, \\ & \int \sqrt{\frac{x^2}{1-x^4}} dx, \\ & \int \frac{x}{1+x^4} dx, \\ & \int \frac{1}{2x+3} dx, \\ & \int (3x+5)^3 dx, \\ & \int \sqrt{\frac{x^2}{x^2+1}} dx, \\ & \int \frac{\cos x}{1+\sin x} dx, \\ & \int \frac{x^2+3x+2}{x^2+1} dx, \\ & \int \frac{2}{4x^2+1} dx. \end{aligned}$$

3. Compute the definite integrals

$$\int_0^1 \frac{1}{\sqrt{1-x^2}} dx,$$

$$\int_1^3 (3x+2)^2 dx,$$

$$\int_{-\pi/5}^{\pi/5} \sin x dx,$$

$$\int_{-\pi}^{\pi} \cos x dx,$$

$$\int_2^3 \frac{x^2}{x^3+1} dx,$$

$$\int_{-1}^1 e^{2x} dx,$$

$$\int_{\pi/6}^{\pi/4} \cot x dx,$$

$$\int_0^{\pi/4} \tan x dx.$$

4. (a) Compute the area of the region that is bounded by the curve $y = \sin x$ and the x axis in the interval $[0, 2\pi]$.

(b) Compute the area of the region that is bounded by the curve $y = \frac{1}{x+1}$, the x -axis, the y -axis, and the curve $x = 1$.

(c) Compute the area of the region that is bounded by the curve $(x^2 + x)y = 2x + 1$, the x -axis, and the lines $x = 2$ and $x = 3$.

(d) Compute the area of the region that is bounded by the curve $y = x + 1/x$, the x axis, and the lines $x = 1$ and $x = 4$.