Math Camp

Homework 6

(1) Use a Riemann sum with 4 subintervals of equal width and right-hand endpoints as sample points to approximate each of the following integrals:

(a)

$$\int_0^4 2^x \, dx$$

(b)

$$\int_1^9 \frac{1}{x} \, dx$$

(2) Compute the following definite integrals using the Fundamental Theorem of Calculus:

(a)

$$\int_0^3 5x^4 + 12x^3 - x^2 + 2 \, dx$$

(b)

$$\int_1^2 \frac{4 + x^2}{x^4} \, dx$$

(c)

$$\int_2^6 \frac{3}{x} \, dx$$

(d)

$$\int_{-1}^1 e^{4x} \, dx$$

(3) Use either substitution or integration by parts to compute the indefinite integrals.

(a)

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

(b)

$$\int x e^{-x^2} \, dx$$

(c)

$$\int x^2 e^x \, dx$$

(d)

$$\int \frac{2e^{2x} + e^x}{\sqrt{e^{2x} + e^x + 1}}\, dx$$

(e)

$$\int x^2 \cos(x)\, dx$$

(f)

$$\int \cos(x) \sin(x) \sqrt{(\sin(x))^2 + 1}\, dx$$

(g)

$$\int \frac{e^{\sqrt{x}}}{\sqrt{x}}\, dx$$