

§5.1-5.4: REVIEW OF INTEGRATION

1.] Find the derivative of the following functions:

$$a.) A(x) = \int_0^x t^2 dt$$

$$b.) B(x) = \int_1^{x^4} \frac{1}{t^2} dt$$

2.] Suppose $f'(x) = 4x^3 + 1$ and $f(1) = 2$. Find $f(x)$.

3.] Compute the following definite integrals:

$$a.) \int_0^2 5x^4 dx$$

$$b.) \int_0^1 (x + \sqrt{x}) dx$$

$$c.) \int_0^{\ln 8} e^x dx$$

$$d.) \int_{\pi/4}^{\pi/2} 8 \csc^2(x) dx$$

4.] Evaluate the following definite integrals. Use symmetry where necessary.

a.) $\int_{-2}^2 (x^9 - 3x^5 + 3x^2 - 10) dx$

b.) $\int_{-\pi/2}^{\pi/2} (\cos(x) + x \cos(x) \sin^2(x)) dx$

c.) $\int_{-1}^1 (1 - |x|) dx$

5.] Find the average value of the function $f(x) = x^2 + 1$ over the interval $[-1, 3]$.

6.] Find the average value of the function $f(x) = \frac{1}{1+x^2}$ over the interval $[-1, 1]$.