

Name: _____

Definite Integrals

1) Use the integration by substitution to find the definite integrals.

$$1) \int_{-1}^3 x(x^2 - 4)^3 dx$$

$$2) \int_0^3 \frac{1}{\sqrt{x+1}} dx$$

$$3) \int_0^1 x^2(x^3 + 1)^5 dx$$

$$4) \int_0^\pi \cos \frac{x}{2} dx$$

$$5) \int_{-\pi/2}^0 \left(2 + \tan \frac{t}{2}\right) \sec^2 \frac{t}{2} dt$$

$$6) \int_\pi^{3\pi/2} \cot^2 \left(\frac{x}{6}\right) \sec^2 \left(\frac{x}{6}\right) dx$$

2) Find the Mean Value for:

$$1. \int_{-1}^1 (2+x)^4 dx$$

$$2. \int_{-1}^{-2} \frac{dx}{\sqrt{x^2 + 2x + 2}}$$

$$3. \int_{\frac{\pi}{4}}^{\frac{3\pi}{4}} \tan \frac{1}{2} x dx$$

3) Find the average value of the function over the given interval.

$$1) f(x) = 3x^2 - 3 \text{ on } [0, 1]$$

$$2) f(x) = x^2 - x \text{ on } [-2, 1]$$