Math 1271 Spring 2021

Worksheet 8

1. Use the Fundamental Theorem of Calculus to find $f'(x)$ when $f(x) =$

   (a) $\int_0^x (t^2 - 3)dt.$

   (b) $\int_3^x (t^2 - 3)dt.$

   (c) $\int_x^3 (t^2 - 3)dt.$

2. Use the Fundamental Theorem of Calculus to evaluate the integral.

   (a) $\int_0^2 x^2 dx.$

   (b) $\int_1^4 x^2 dx.$

(c) $\int_0^3 e^x dx.$

(d) $\int_{-2}^2 e^x dx.$

(e) $\int_0^\pi \sin x dx.$

(f) $\int_0^{\pi/4} \sec^2 x dx.$

(g) $\int_1^2 \frac{1}{x} dx.$

(h) $\int_1^2 \frac{1}{x+1} dx.$

(i) $\int_1^2 \frac{1}{x(x+1)} dx$

3. Rewrite the following limit as definite integral, then evaluate it using FTC.

$$\lim_{n\to\infty} \sum_{i=1}^{n} \frac{1}{n + i^2/n}$$

4. Do the following Riemann sums using midpoints.

   (a) $f(x) = e^x$, $[-2, 2]$, $n = 4$.

   (b) $f(x) = x^2 + 1$, $[0, 1]$, $n = 3$.