

**Homework #12**Due **Wednesday, March 11th** in Gradescope by 11:59 pm ET**Goal:** Computing More Definite Integrals using the Fundamental Theorem of Calculus.

Compute the following Definite Integrals

1.  $\int_0^1 (x+1)(x-3) dx$

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

3.  $\int_1^2 \frac{x^4+1}{x^2} dx$

4.  $\int_1^2 \frac{3}{x^4} dx$

5.  $\int_{-2}^{-1} x^2 dx$

6.  $\int_1^4 (3-\sqrt{x})(1+2\sqrt{x}) dx$

7.  $\int_1^2 \frac{(3x+2)(x-2)}{x^4} dx$

8.  $\int_1^4 \frac{(x^{\frac{3}{2}}-1)^2}{x^2} dx$

9.  $\int_{-2}^{-1} \left(x - \frac{2}{x}\right)^2 dx$

10.  $\int_1^8 \frac{1}{x^{\frac{4}{3}}} dx$

11.  $\int_1^4 \sqrt{x}(1+x) dx$

12.  $\int_1^9 \frac{x^2 + \sqrt{x}}{x^2 \cdot \sqrt{x}} dx$

13.  $\int_{-2}^3 |x-1| dx$

14.  $\int_{-1}^2 x - 2|x| dx$

15.  $\int_0^{\frac{3\pi}{2}} |\sin x| dx$

16. If  $f(1) = 12$ ,  $f'$  is continuous, and  $\int_1^4 f'(x) dx = 17$ , what is the value of  $f(4)$ ?

Use Part 1 of the Fundamental Theorem of Calculus to compute the Derivative of the following function:

17.  $g(x) = \int_1^x \frac{1}{t^3+1} dt$

18.  $F(x) = \int_5^x \sqrt{1+\sqrt{t}} dt$

19.  $H(x) = \int_x^3 (2+t^4)^5 dt$

# REGULAR OFFICE HOURS

**Monday: 12:00–3:00 pm**

7:30–9:00 pm TA Uchenna, SMUDD 208A

**Tuesday: 1:00–4:00 pm**

**Wednesday: 1:00–3:00 pm**

**Thursday: none for Professor**

4:00–5:30 pm TA Uchenna, SMUDD 208A

**Friday: 12:00–2:00 pm**

- Check the Order of the Fundamental Theorem of Calculus.
  - Check minus signs carefully.
  - Pop into Office Hours this week.