

Homework #12Due **Wednesday, March 12th** 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 Andrew, SMUDD 207

Tuesday: 1:00–4:00 pm

Wednesday: 1:00–3:00 pm

Thursday: none for Professor

8:00–9:30 pm TA Andrew, 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.