Math 106, Spring 2022

Homework #5

Due **Wednesday, February 23rd** in Gradescope by 11:59 pm ET

Goal: More Related Rates with Trigonometry and Starting Antiderivatives

1. A lighthouse is located on a small island 3 km away from the nearest point P on a straight shoreline and its light makes four revolutions per minute. How fast is the beam of light moving along the shoreline when it is 1 km from P?

Compute the following Indefinite Integrals in order to find the Most General Antiderivative of each function.

2. $\int x - 3 \; dx$

3. $\int 5x^9 - 3x^6 + 12x^3 \; dx$

4. $\int 7 + \frac{3}{4}x^2 - \frac{4}{5}x^3 \; dx$

5. $\int 7x^{\frac{2}{5}} + 8x^{-\frac{4}{5}} + \sqrt{2} \; dx$

6 $\int \frac{10}{x^9} + \frac{9}{x^4} \; dx$

7. $\int \frac{1}{x^{\frac{2}{7}}} + \frac{1}{2\sqrt{x}} \; dx$

8. $\int x^2 - \frac{5}{x^3} + \frac{2}{3}x^{\frac{2}{3}} \; dx$

9. $\int \frac{1 + x^2 + x^9}{x^2} \; dx$

10. $\int 2\sin x - 7\sec^2 x - 3\sec x \tan x \; dx$

11. $\int (x+1)(2x-1) \; dx$

Find the function f which satisfies each of the following:

12. $f'(x) = 1 + 3\sqrt{x}$ and $f(4) = 25$

13. $f'(x) = \sin x$ and $f(\pi) = -5$

14. $f''(x) = \sin x + \cos x$ and $f'(0) = 4$ and $f(0) = 3$

15. $f''(x) = 20x^3 - 12x^2 + 6x$ and $f'(1) = -5$ and $f(1) = -10$.

REGULAR OFFICE HOURS

Monday: 1:00–3:00 pm

Tuesday: 12:00–4:00 pm

7:30–9:000 pm TA Bobby, SMUDD 205

Wednesday: 1:00-3:00 pm

Thursday: none for Professor

7:30–9:000 pm TA Bobby, SMUDD 205

Friday: 12:00–2:00 pm

- Please take the time to read over your class notes this week.
- Try to understand the Trig concepts and not just the numbers and formulas.