

Homework #5**Due Wednesday, February 15th** 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.

$$2. \int x - 3 \, dx \qquad 3. \int 5x^9 - 3x^6 + 12x^3 \, dx \qquad 4. \int 7 + \frac{3}{4}x^2 - \frac{4}{5}x^3 \, dx$$

$$5. \int 7x^{\frac{2}{5}} + 8x^{-\frac{4}{5}} + \sqrt{2} \, dx \qquad 6. \int \frac{10}{x^9} + \frac{9}{x^4} \, dx \qquad 7. \int \frac{1}{x^{\frac{2}{7}}} + \frac{1}{2\sqrt{x}} \, dx$$

$$8. \int x^2 - \frac{5}{x^3} + \frac{2}{3}x^{\frac{2}{3}} \, dx \qquad 9. \int \frac{1 + x^2 + x^9}{x^2} \, dx \qquad 10. \int 2 \sin x - 7 \sec^2 x - 3 \sec x \tan x \, dx$$

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

Find the function f which satisfies each of the following:

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

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

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

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

REGULAR OFFICE HOURS

Monday: 12:00–3:00 pm

Tuesday: 1:00–4:00 pm

7:30–9:00 pm TA Ellerman, SMUDD **204**

Wednesday: 1:00-3:00 pm

Thursday: none for Professor

7:30–9:00 pm TA Ellerman, SMUDD **207**

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.