

Homework #7 (Exam 1 Review Packet)Due **Wednesday, February 22nd** in Gradescope by 11:59 pm ET**Goal:** Review Packet of Derivatives and Antiderivatives involving TrigonometryFor #1 – 9, Differentiate each of the following functions. Do **NOT** simplify your answers.

$$1. f(x) = \frac{\left(\cos x - \frac{1}{\sqrt{x}}\right)^9}{\sec(4x)} \quad 2. y = \sin^3(x^3) \quad 3. y = \tan^3 \sqrt{x^9 - \cos x}$$

$$4. f(t) = t^2 \sin^5(2t) \quad 5. g(x) = \frac{\cos(3x)}{\sin(4x)} \quad 6. g(t) = \cos\left(\sin^3\left(\frac{t}{\sqrt{t+1}}\right)\right)$$

$$7. g(x) = \sqrt{\cos(x^2 - \sin x)} \quad 8. g(x) = \sin \sqrt{x^2 + \sec x} \quad 9. f(x) = \frac{1}{\tan(\sqrt{x} + \cos x)}$$

10. Compute $g'(0)$ where $g(x) = \cos(3x) \cdot \sin(4x)$. Simplify.11. Let $H(x) = \cos(4x)$. Compute $H'\left(\frac{\pi}{3}\right)$ and $H'\left(\frac{\pi}{8}\right)$. Simplify.12. Compute $f'\left(\frac{\pi}{12}\right)$, where $f(x) = \cos^2(2x) + \sec(4x) + \frac{\sqrt{3}}{\tan^2(3x)}$. Simplify.13. Consider $\sin(xy) = \sec x + \cos(\pi) - y$. Compute the derivative $\frac{dy}{dx}$.14. A photographer is televising a 100-yard dash from a position 5 yards from the track in line with the finish line. When the runners are 12 yards from the finish line, the camera is turning at the rate of $\frac{3}{5}$ radians per second. How fast are the runners moving then?15. An object moves on a number line. Its acceleration at time t is given by $a(t) = t + \cos t$ ft/sec². Assume also that its velocity at time $t = 0$ is 3 feet per second, and its position at time $t = 0$ is at -2 feet on the number line. Find its position at time t .16. Find the function $f(x)$ that satisfies $f'(x) = \sec^2 x + \sqrt{3} \sin x$ and $f\left(\frac{\pi}{3}\right) = 5\sqrt{3}$

17. $\int \sqrt{x} + \frac{1}{2\sqrt{x}} dx$ 18. $\int \frac{x^2 + \sqrt{x}}{x^{\frac{3}{7}}} dx$ 19. $\int \left(x^2 + \frac{1}{x^2}\right) \left(\sqrt{x} + \frac{1}{\sqrt{x}}\right) dx$

20. $\int \frac{8}{7}x + \frac{7}{8} - \frac{1}{x^{\frac{7}{8}}} + x^{\frac{8}{7}} + \frac{7}{x^{\frac{8}{7}}} - 8x^{\frac{7}{8}} dx$

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

- Start to Review for Exam #1
- Use the Practice Exams posted on the Main Webpage