Homework #6 (Exam 1 Review Packet)

Due **Tuesday, March 1st** in Gradescope by 11:59 pm ET

Goal: Review Packet of Derivatives and Antiderivatives involving Trigonometry

For $\#1 - 9$, Differentiate each of the following functions. Do **NOT** simplify your answers.

1. $f(x) = \dfrac{\left(\cos x - \dfrac{1}{\sqrt{x}}\right)^9}{\sec(4x)}$

2. $y = \sin^3(x^3)$

3. $y = \tan^3 \sqrt{x^9 - \cos x}$

4. $f(t) = t^2 \sin^5(2t)$

5. $g(x) = \dfrac{\cos(3x)}{\sin(4x)}$

6. $g(t) = \cos\left(\sin^3\left(\dfrac{t}{\sqrt{t+1}}\right)\right)$

7. $g(x) = \sqrt{\cos(x^2 - \sin x)}$

8. $g(x) = \sin \sqrt{x^2 + \sec x}$

9. $f(x) = \dfrac{1}{\tan\left(\sqrt{x} + \cos x\right)}$

10. Compute $g'(0)$ where $g(x) = \cos(3x) \cdot \sin(4x)$. Simplify.

11. Let $H(x) = \cos(4x)$. Compute $H'\left(\dfrac{\pi}{3}\right)$ **and** $H'\left(\dfrac{\pi}{8}\right)$. Simplify.

12. Compute $f'\left(\dfrac{\pi}{12}\right)$, where $f(x) = \cos^2(2x) + \sec(4x) + \dfrac{\sqrt{3}}{\tan^2(3x)}$. Simplify.

13. Consider $\sin(xy) = \sec x + \cos(\pi) - y$. Compute the derivative $\dfrac{dy}{dx}$.

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/sec^2. 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 $f\left(\dfrac{\pi}{3}\right) = 5\sqrt{3}$

17. $\displaystyle\int \sqrt{x} + \dfrac{1}{2\sqrt{x}}\ dx$

18. $\displaystyle\int \dfrac{x^2 + \sqrt{x}}{x^{\frac{3}{7}}}\ dx$

19. $\displaystyle\int \left(x^2 + \dfrac{1}{x^2}\right)\left(\sqrt{x} + \dfrac{1}{\sqrt{x}}\right)\ dx$

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

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

- Start to Review for Exam #1