

## Homework #3

Due **Wednesday, February 16th** in Gradescope by 11:59 pm ET**Goal:** More Trigonometry, Angles & Trigonometric Derivatives (including the Chain Rule).For #1 – 2, evaluate the following Trig expressions, keeping  $0 \leq \theta < \frac{\pi}{2}$ 

1. If  $\sin \theta = \frac{1}{2}$ , find  $\cos \theta$     2. If  $\cos \theta = \frac{2}{5}$ , find  $\tan \theta$

For #3 – 4, use the facts  $\frac{d}{dx} \sin x = \cos x$  and  $\frac{d}{dx} \cos x = -\sin x$  to prove that

3.  $\frac{d}{dx} \tan x = \sec^2 x$     and    4.  $\frac{d}{dx} \sec x = \sec x \tan x$     **Memorize.**

For #5 – 6, solve for angle(s)  $\theta$  in Radians keeping  $0 \leq \theta < 2\pi$ .

5.  $\sin \theta = -\frac{1}{2}$     6.  $\sin \theta = -\frac{\sqrt{3}}{2}$

For #7 – 8, compute the following values. Justify. Show work on the Unit Circle/Trig Triangles.

7.  $\cos \frac{4\pi}{3}$     8.  $\sin \frac{4\pi}{3}$

For #9 – 17, compute the Derivative for each of the following functions. Do **Not** simplify.

9.  $y = \sin(x^2 - 5x + 8)$     10.  $f(x) = \sin^2 x$     11.  $y = \cos^6(3x)$

12.  $y = \cos \sqrt{x}$     13.  $y = \sqrt{\cos x}$     14.  $f(x) = \frac{\cos(3x)}{\sin(4x)}$

15.  $y = \tan\left(\frac{1}{x}\right)$     16.  $f(x) = \frac{1}{\tan x}$     17.  $y = \left(\frac{\cos x}{x^2 - \sin x}\right)^8$

18. Let  $G(x) = \sin(2x) - \cos(3x)$ . Compute  $G'\left(\frac{\pi}{6}\right)$ . Simplify your answer completely.

# REGULAR OFFICE HOURS

**Monday: 1:00–3:00 pm**

**Tuesday: 12:00–4:00 pm**

7:30–9:00 pm TA Bobby, SMUDD 205

**Wednesday: 1:00-3:00 pm**

**Thursday: none for Professor**

7:30–9:00 pm TA Bobby, SMUDD 205

**Friday: 12:00–2:00 pm**

- Weve finished a solid review of Trigonometry, and derivatives from Math 105. Aim to make clearer and neater solutions this week.
- Attend Office Hours, both with Professor Benedetto and Math Fellow Bobby Innes-Gold.