

**Homework #2**

Due **Friday, January 31st** in Gradescope by 11:59 pm ET

Review all Trigonometry Notes from class

**Goal:** Review More Derivatives, Trigonometry, Angles & Trigonometric Derivatives.

**FIRST:** Read through and understand the following Examples.

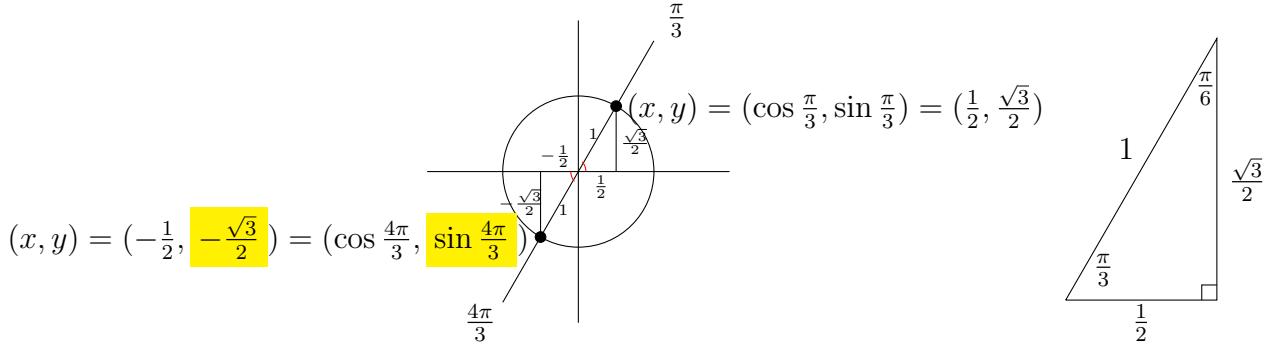
Ex: Differentiate  $f(x) = \frac{5}{(7x^3 - x^5)^6}$  prep  $\stackrel{\text{prep}}{=} 5(7x^3 - x^5)^{-6}$ .

Compute  $f'(x) = -30(7x^3 - x^5)^{-7}(21x^2 - 5x^4)$

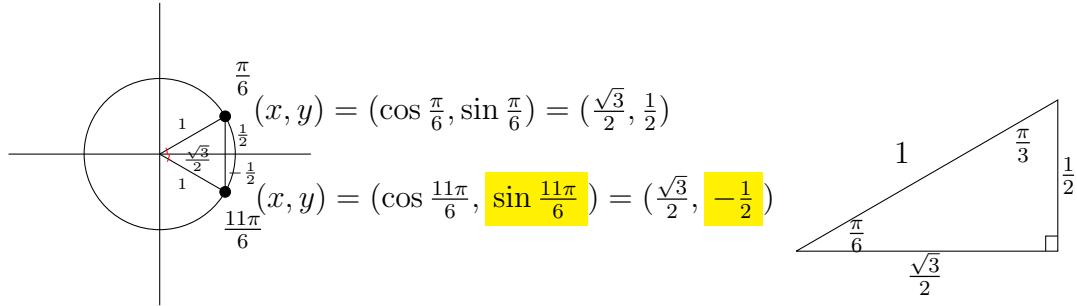
Ex: Differentiate  $G(x) = \left(\frac{1}{3x^7} - \frac{7}{x^3}\right)^4$  prep  $\stackrel{\text{prep}}{=} \left(\frac{1}{3}x^{-7} - 7x^{-3}\right)^4$ .

Compute  $f'(x) = 4\left(\frac{1}{3x^7} - \frac{7}{x^3}\right)^3 \cdot \left(-\frac{7}{3}x^{-8} + 21x^{-4}\right)$

Ex: Show that  $\sin\left(\frac{4\pi}{3}\right) = \boxed{-\frac{\sqrt{3}}{2}}$ . Justify using the Unit Circle and the reference triangle.



Ex: Show that  $\sin\left(\frac{11\pi}{6}\right) = \boxed{-\frac{1}{2}}$ . Justify using the Unit Circle and the reference triangle.



Next, Complete the following Homework problems.

**Match** your final answers to the posted Answer Key.

For #1 – 5, compute the Derivative of each of the following functions. Do **Not** Simplify.

$$1. f(x) = \frac{4}{x^5} - \frac{5}{4x} - \frac{4}{5} + \frac{1}{4\sqrt{x}} \quad 2. y = (x^2 + 5x)^4 \quad 3. y = \frac{1}{(x^2 + 5x)^4}$$

$$4. y = \frac{1}{\sqrt{x^3 - 9x + 3}} \quad 5. y = \left( \frac{1}{x^3} + 7x \right)^{\frac{5}{7}} \left( x^4 - \frac{1}{x^7} \right)^{-5}$$

6. Compute the equation of the Tangent Line to  $y = 6\sqrt{2x+7}$  at the point where  $x = 1$ . Simplify.

7. Graph the function  $y = \sin x$  on the interval  $[0, 2\pi]$ . Determine the following values:

$$\sin 0 \quad \sin \frac{\pi}{2} \quad \sin \pi \quad \sin \frac{3\pi}{2} \quad \sin 2\pi$$

8. Graph the function  $f(x) = \cos x$  on the interval  $[0, 2\pi]$ . Determine the following values:

$$\cos 0 \quad \cos \frac{\pi}{2} \quad \cos \pi \quad \cos \frac{3\pi}{2} \quad \cos 2\pi$$

9. Make a chart of the Trig. Values for sine, cosine and tangent for all angles  $\theta = 0, \frac{\pi}{6}, \frac{\pi}{4}, \frac{\pi}{3}, \frac{\pi}{2}, \pi, \frac{3\pi}{2}, 2\pi$

For #10 – 15, compute the following values. Justify. Show work using Unit Circle and Trig Triangles.

$$10. \cos \frac{2\pi}{3} \quad 11. \sin \frac{5\pi}{3} \quad 12. \sin \frac{7\pi}{6} \quad 13. \cos \frac{5\pi}{4} \quad 14. \sin \frac{5\pi}{6}$$

For #15 – 16, find the equation of the tangent line to  $f(x)$  at the given  $x$ -value. Simplify.

$$15. f(x) = \sin x \text{ at } x = 0 \quad 16. f(x) = \cos x \text{ at } x = \frac{\pi}{6}$$

For #17 – 20, compute the Derivative for the following functions. Do **Not** Simplify.

$$17. y = \frac{1}{x} - 2\cos x - \sin x \quad 18. f(x) = \sqrt{x} \cdot \sin x$$

$$19. f(x) = \cos x \cdot \sin x \quad 20. f(x) = \frac{\cos x}{x^2 + 3}$$

## REGULAR OFFICE HOURS

**Monday: 12:00–3:00 pm**

**Tuesday: 1:00–4:00 pm**

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

**Friday: 12:00–2:00 pm**

**Math Fellow evening TA Help Hours TBD soon**

- Please take the time to read over your class notes this week.
- Work towards full understanding of the Trig concepts and not just the numbers and formulas.