

MATH 202, Fall 2023**In class work 9****Name:** _____**Row and Seat:** _____

In class work **9** has questions **1** through **4** with a total of **8** points. Turn in your work at the end of class *on paper*.

This assignment is due *Tuesday 26 September 13:20*.

Here are some results that you might like to use

$$\cos(x)^2 = \frac{\cos(2x)}{2} + \frac{1}{2},$$

$$\cos(x)^4 = \frac{\cos(4x)}{8} + \frac{\cos(2x)}{2} + \frac{3}{8},$$

$$\sin(x)^2 = \frac{1}{2} - \frac{\cos(2x)}{2},$$

$$\cos(x)^2 \sin(x)^2 = \frac{1}{8} - \frac{\cos(4x)}{8},$$

$$\cos(x)^4 \sin(x)^2 = -\frac{\cos(6x)}{32} - \frac{\cos(4x)}{16} + \frac{\cos(2x)}{32} + \frac{1}{16},$$

$$\sin(x)^4 = \frac{\cos(4x)}{8} - \frac{\cos(2x)}{2} + \frac{3}{8},$$

$$\cos(x)^2 \sin(x)^4 = \frac{\cos(6x)}{32} - \frac{\cos(4x)}{16} - \frac{\cos(2x)}{32} + \frac{1}{16},$$

$$\cos(x)^4 \sin(x)^4 = \frac{\cos(8x)}{128} - \frac{\cos(4x)}{32} + \frac{3}{128}.$$

- 2 1. Use Desmos to sketch the region Q defined as $Q = \{(x, y) \mid 0 \leq y \leq x^4 \sqrt{1-x^2} \text{ and } 0 \leq x \leq 1\}$. Duplicate the graph here.

- 2 2. Find $\text{area}(Q)$.

2 3. Using your graph, make a pretty good guess for the x-coordinate to the centroid of Q .

2 4. Find the x-coordinate to the centroid of Q .