MATH 202, Fall 2023
In class work 10

Name: _____
Row and Seat: _____

In class work **10** 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

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

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

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

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

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

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

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

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

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

$\boxed{2}$ 2. Find 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.