MATH 202, Fall 2024
In class work 11

Name: _____

Row and Seat: _____

In class work **11** 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 *Thursday February 29 13:20.*

Here are some results that you might like to use

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

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

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

2 2. Find area(Q). **Suggestion:** Substitute $x = \sin(\theta)$. When you change variables, also change the limits of integration; for example, when $x = 1$, we have $\theta = \frac{\pi}{2}$.

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 of the centroid of Q.