MATH 202, Fall 2024 **Name:** _____
In class work 11 **Row and Seat:** _____

"There is nothing more precious than laughter–it is strength to laugh and lose oneself, to be light." FRIDA KAHLO

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

$$\cos(x)^2\sin(x)^4 = \frac{\cos(6x)}{32} - \frac{\cos(4x)}{16} - \frac{\cos(2x)}{32} + \frac{1}{16},$$
$$\cos(x)^4\sin(x)^4 = \frac{\cos(8x)}{128} - \frac{\cos(4x)}{32} + \frac{3}{128},$$
$$\cos(\theta)^2\sin(\theta)^5 = \frac{\sin(7\theta)}{64} - \frac{3\sin(5\theta)}{64} + \frac{\sin(3\theta)}{64} + \frac{5\sin(\theta)}{64},$$
$$\cos(\theta)^5\sin(\theta)^5 = \frac{\sin(10\theta)}{512} - \frac{5\sin(6\theta)}{512} + \frac{5\sin(2\theta)}{256}$$

[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.

[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.