Name:_____

Calculus Your Try Problems for Chapter 8

8a) Find the total area enclosed by $f(x)=x^4-4x^2$ and $g(x)=x^2-4$.

8b) Use Calculus to show that the area of a cone with a height equal to the diameter is $\frac{2}{3}\pi r^3$.

8c) Find the volume of the paraboloid $z=x^2+y^2$; $0\le z\le 2$.

8e-h) See Attached Worksheet (No Answers Given)

8i1) Convert $y=2$ into polar coordinates.

8i2) Convert $\theta=\frac{\pi}{6}$ into rectangular coordinates.

8j) See attached sheet.

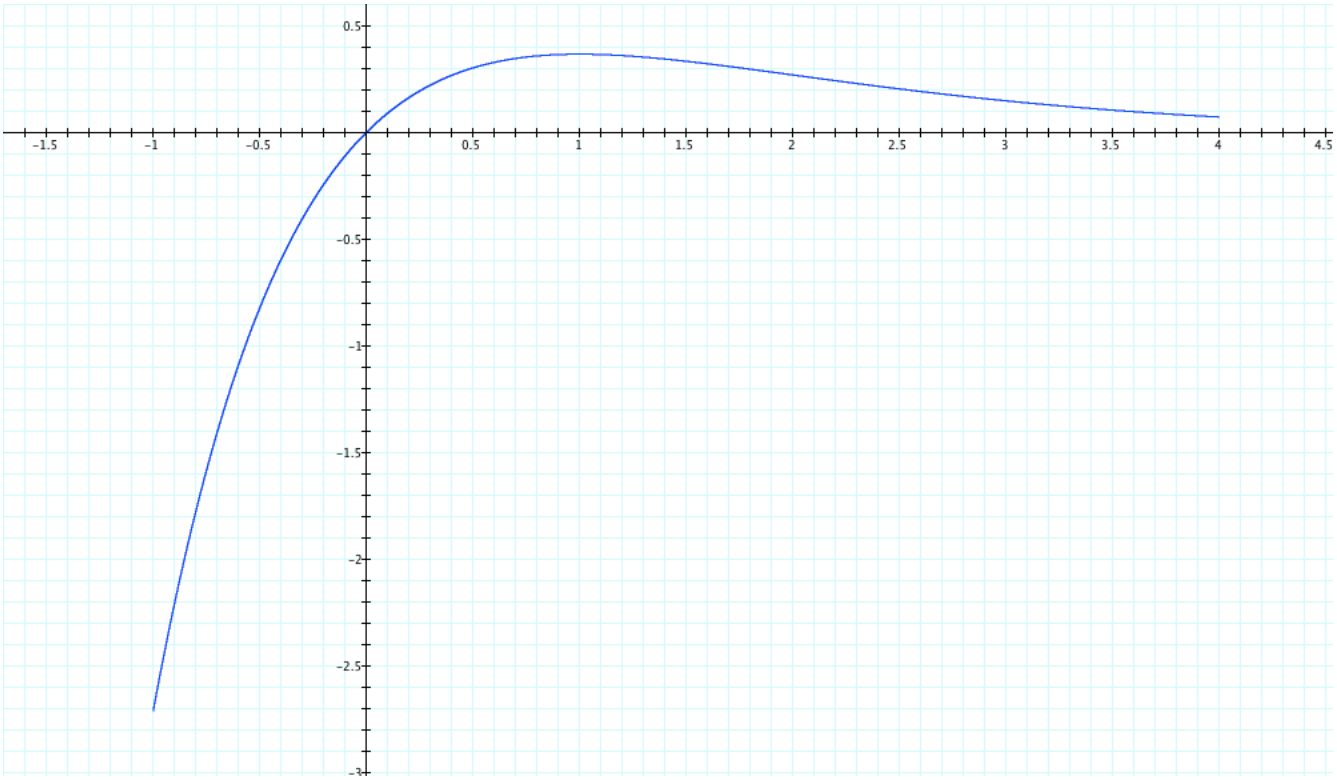
8k) See attached sheet.

Calculus Worksheet to accompany textbook section 8.2 and my YouTube videos (links sent by email).

1) In the next problem, we are going to find the length of y = sin(x) from $0 \le x \le 2\pi$. But, before we get started, I want to make a statement that I think it is obvious that the answer needs to be between 2π and $2\pi+4$. That is: $6.28 <$ curve length < 10.28. How can I make that statement? Please explain how I can come to that conclusion.

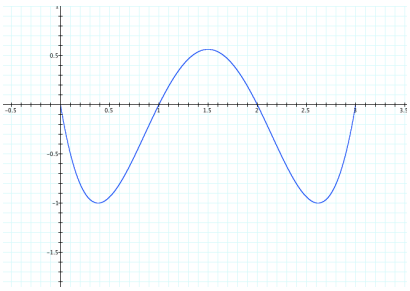
2) Now, calculate the length of the curve y = sin(x) from $0 \le x \le 2\pi$.

3) The diagram below is the graph of $y = xe^{-x}, -1 \le x \le 4$. Print out this page. Take a piece of thin string and carefully lay it along the curve. Then, lay that piece of string along the x-scale and carefully measure the length of this curve.

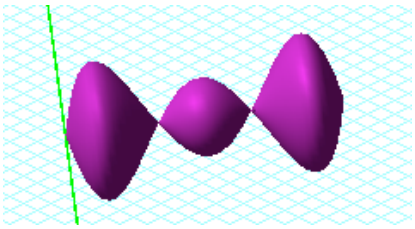


4) Now, calculate the length of the curve: $y = xe^{-x}, -1 \le x \le 4$. Please remember to use product-rule when taking the derivative.

5) Calculate the length of the curve: $y = x^4 - 6x^3 + 11x^2 - 6x, 0 \le x \le 3$. (see below

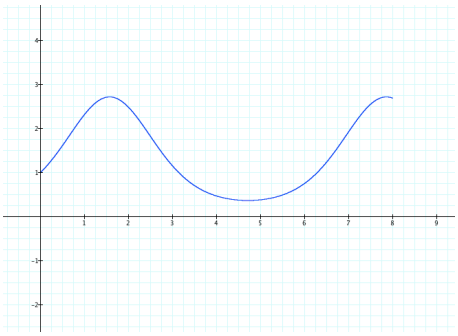


6) Now, calculate the surface area generated by revolving $y = x^4 - 6x^3 + 11x^2 - 6x, 0 \le x \le 3$ around the x-axis.

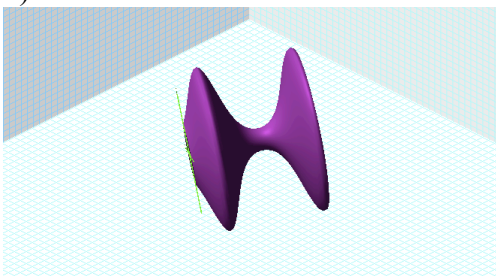


7) Now use disk-method to calculate the volume of the object in problem 6.

8) Find the length of the curve: $y = e^{\sin x}, 0 \le x \le 8$. Remember to use chain-rule when taking the derivative.

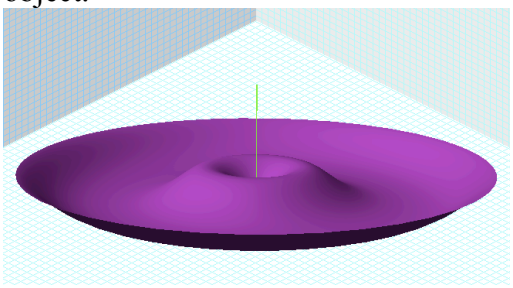


9) Now find the surface area of this curve when it is rotated around the x-axis.



10) Now find the volume of that same object.

11) Now let's rotate that object around the y-axis. Use shell-method to find the volume of this new object.

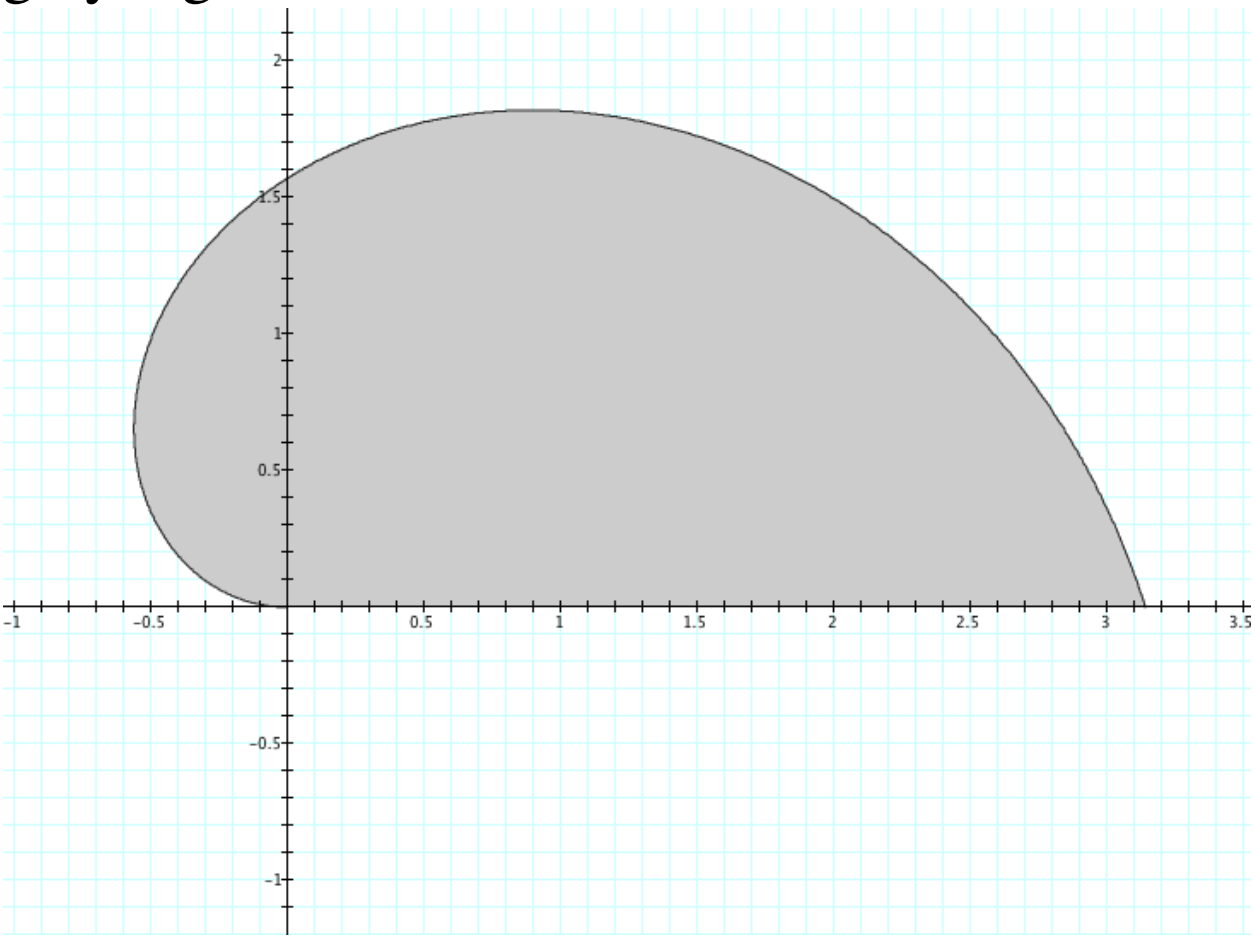


12) Bonus: I haven't figured out how to find the surface area of the object in problem 11. But I bet I could. Can you?

■ $r = \pi - \theta$

■ $0 \le r \le \pi - \theta, 0 \le \theta \le \pi$

YourTry 8j: Find the area of the grey region.
YourTry 8k: Find the entire perimeter of the grey region.



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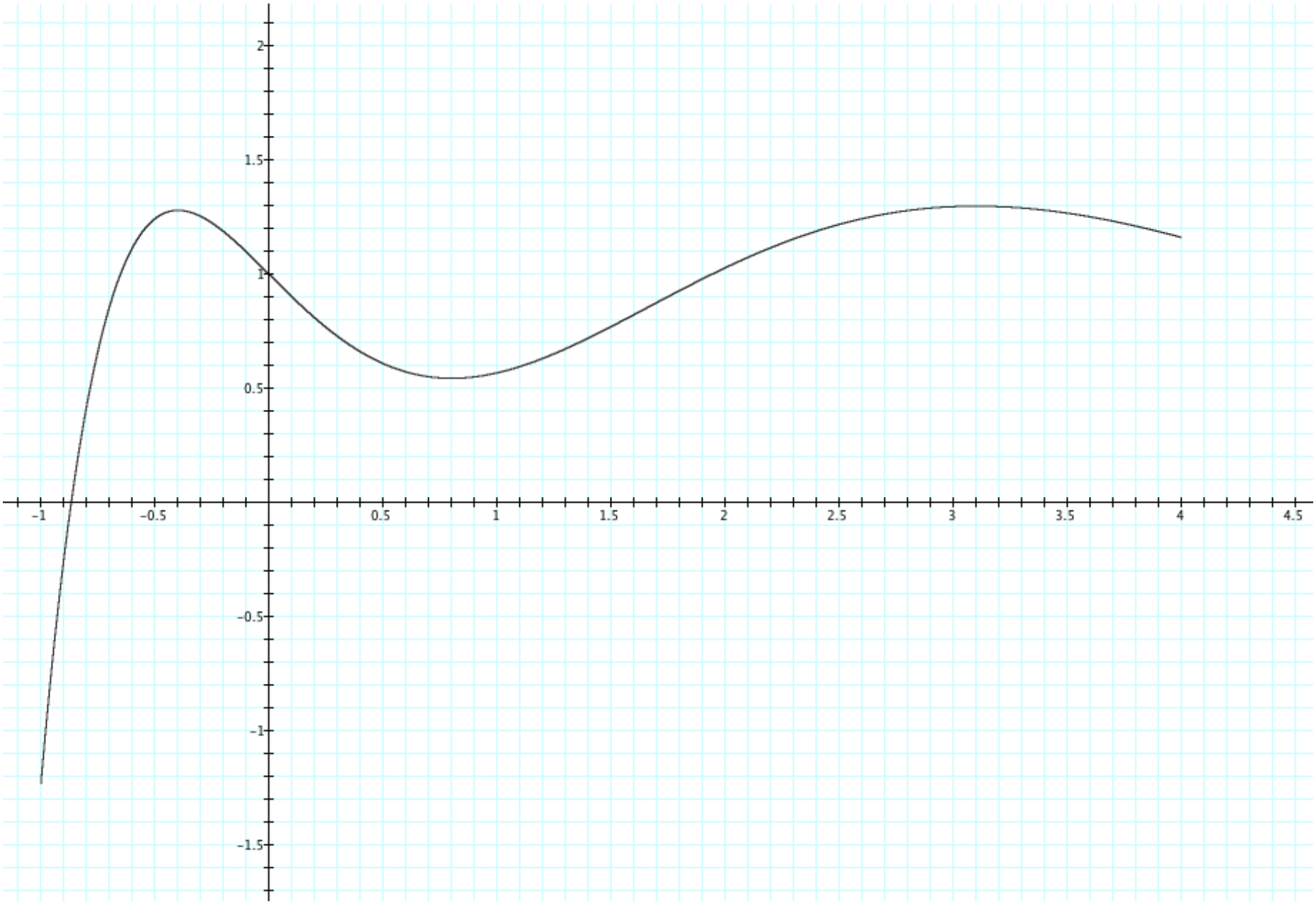
Calculus Curve Length Hands-On Activity

We'll be using string to verify the length of this curve that we will find using Calculus. $y=(x^3+\cos x)e^{-x}$, -1<x<4

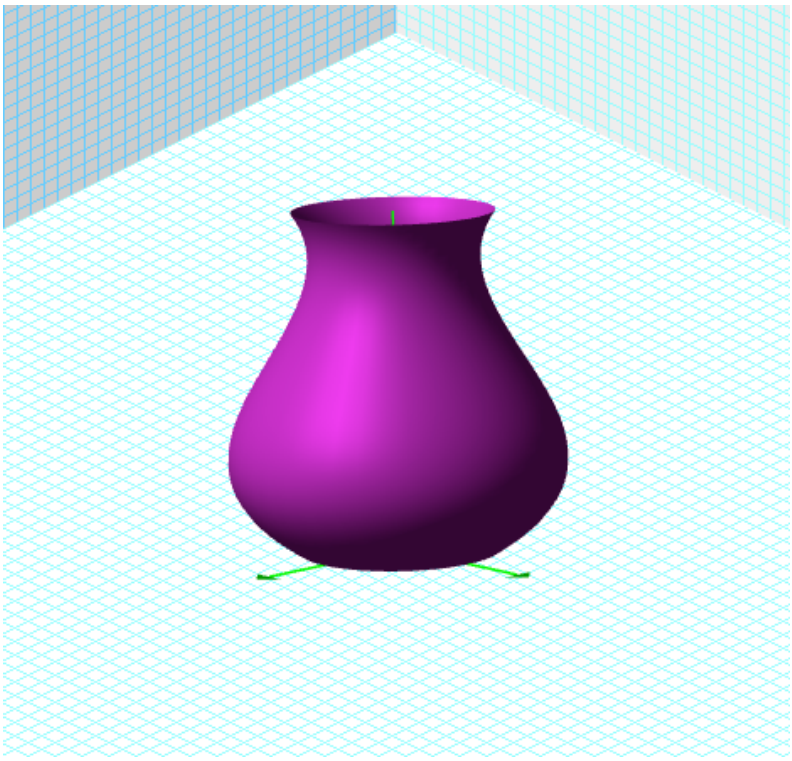


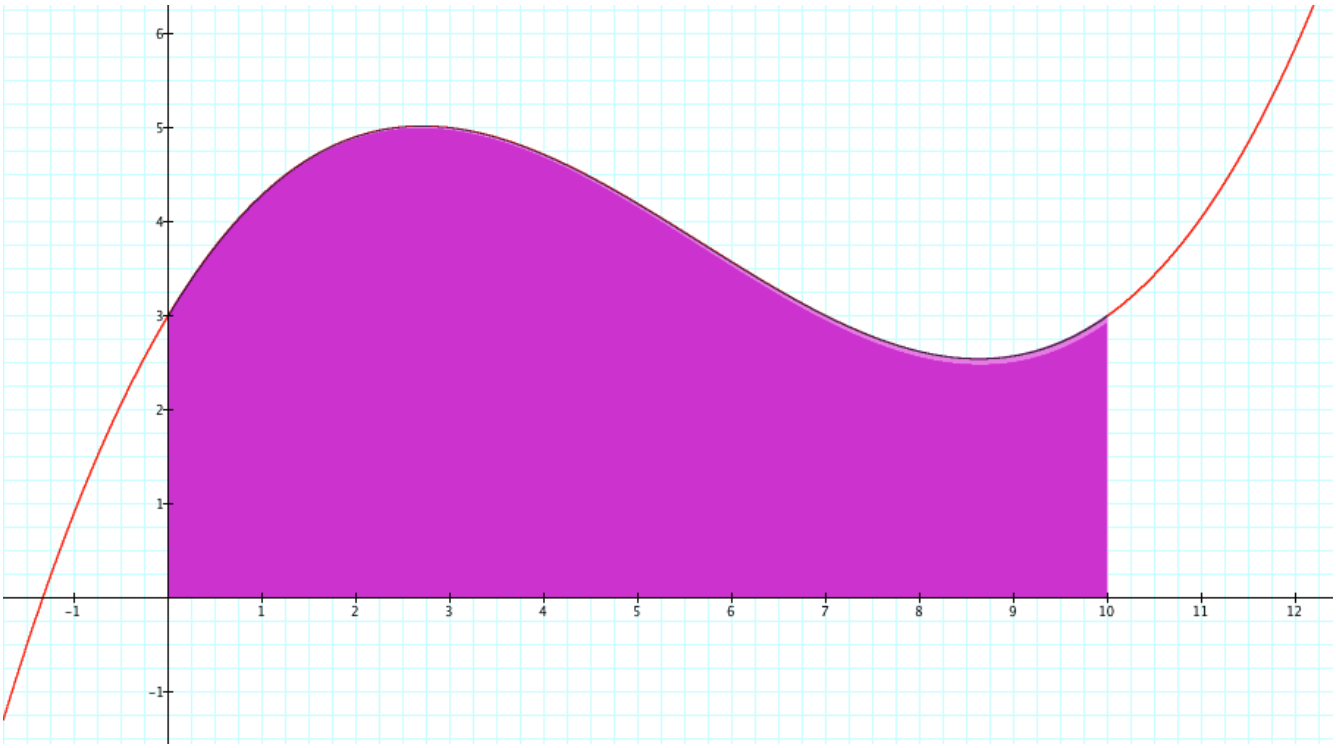
Name:_____

Calculus Disk Method Hands-On Activity

In class we will be demonstrating Disk Method by building this out of cardboard circles.

(Go to the related Google-Docs Spreadsheet) $y=\frac{1}{42}x^3-\frac{17}{42}x^2+\frac{5}{3}x+3$





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Calculus Shell Method Hands-On Activity

In class we will be demonstrating Disk Method by building this out of foam rectangles.

(Go to the related Google-Docs Spreadsheet) $y = \frac{x}{2}\sin\frac{x}{3} + 10$