Create demonstrations of the Disk and Shell Methods for volumes of revolution. All files created must contain the first four letters of your last name.

For the disk method, we will consider the solid of revolution by revolving the region formed by $y = f(x)$, $y = 0$, $x = a$, and $x = b$ about the line $y = k$. For the shell method, we will consider the solid of revolution by revolving the same region about the line $x = k$. To make it easier, we will assume that the lines of revolution lie completely outside or on the border of the revolved region.

Your function(s) will have as inputs the function $f(x)$, a, b, k and the positive integer n. Your function should check that $a < b$ and that either x or y is given and that n is a positive integer. Your function(s) will do the following:

- Create a figure that shows the region and the line of revolution with the region shaded/colored and an appropriate title.
- Form n rectangles of width $\Delta x = (b-a)/n$ and height of each rectangle is $f(x_k^*)$, where x_k^* is the midpoint of the k-th subinterval. These rectangles along with the original region will be graphed in a second figure.
- Revolve these rectangles to form the approximating disks (or approximating shells), and plot these disks (shells) in 3D. You will also calculate the volume of these approximating disks (shells) and display the answer both in the title of the plot and as output of the function.
- Show the volume of revolution in 3D.

In all of the figures created, axes should be labeled, appropriate titles created, etc. They shouldn't appear jagged so appropriate domains/views will need to be defined.

Your report should show the use of these for various functions and/or values of n, and different lines of revolution.

Some useful MATLAB commands are `sphere` and `cylinder`.