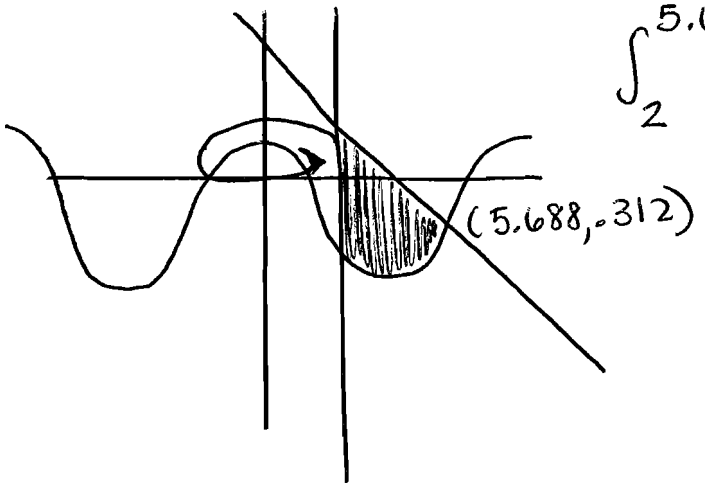
Calculus 1 Name Key

Review Disk, Washer Shells (2) Block 9 Date _____

Find the volume generated when the region within the given boundaries is rotated about a specific line. Use the method of disks, washers, or shells to find the volume.

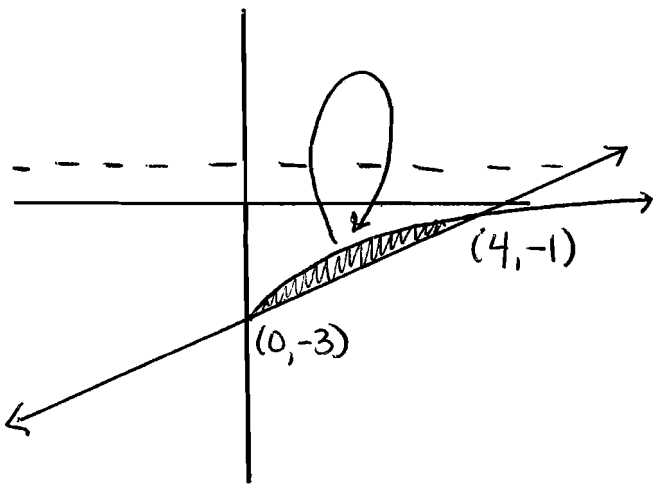
1) $y = 4\cos(x) - 3$, $y = -x + 6$, $x = 2$ about y-axis




$$\int_2^{5.688} 2\pi x\left((-x+6)-(4\cos x-3)\right)dx$$

527.59

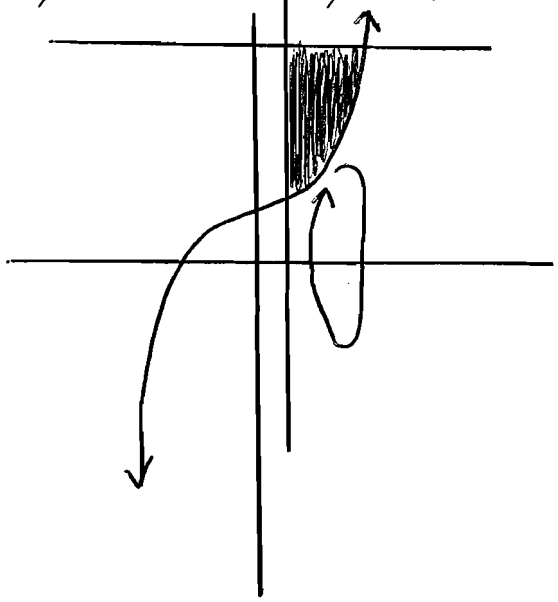
2) $y = \sqrt{x} - 3$ and $y = \frac{1}{2}x - 3$ about the line y = 1




$$\int_0^4 \pi\left(\left(1-\left(\tfrac{1}{2}x-3\right)\right)^2-\left(1-\left(\sqrt{x}-3\right)\right)^2\right)dx$$

25.133

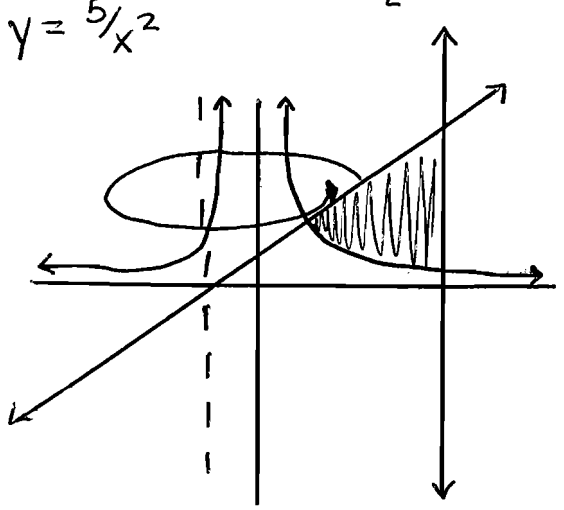
3) $y = x^3 + 2$ and $y = 5$ and $x = .5$ about the x-axis



$$\int_{.5}^{1.442} \pi\left((5)^2-(x^3+2)^2\right)dx$$

42.945

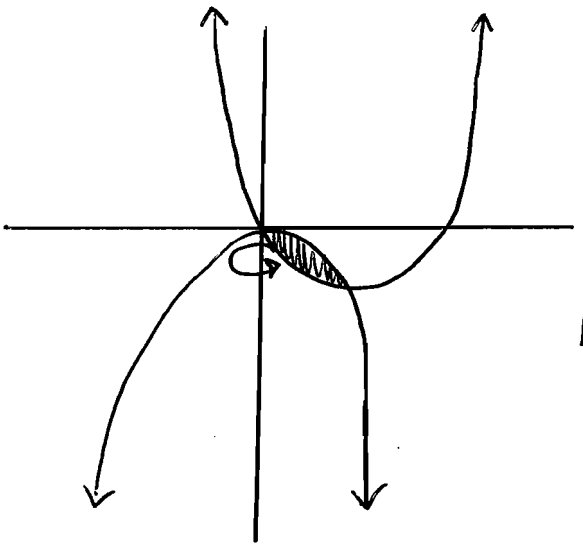
4) $yx^2 = 5$ and $y = \frac{1}{2}x + 2$ and x = 5 about the line x = -2




$$\int_{1.365}^{5} 2\pi\,(x - -2)\left(\left(\tfrac{1}{2}x + 2\right) - \left(\tfrac{5}{x^2}\right)\right)dx$$

363.402

5) $y = x^2 - 5x$ and $y = -2x^2$ about y-axis

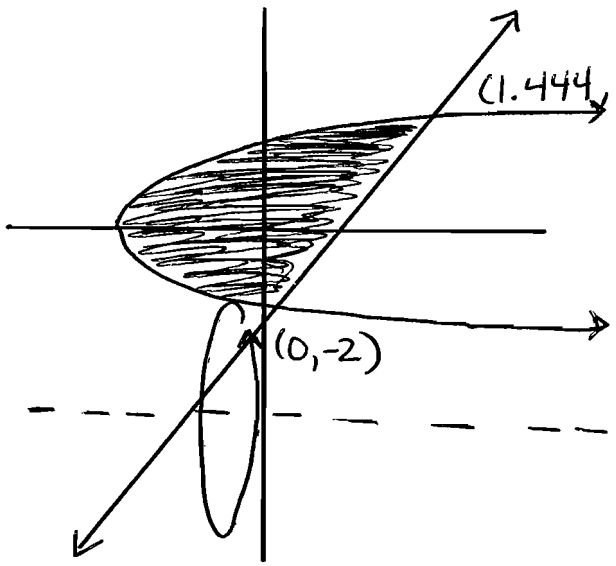


$$\int_{0}^{1.667} 2\pi x\left((-2x^2) - (x^2 - 5x)\right)dx$$

12.12

Note:
if you try to do this as a right left you cannot solve for x in the 1st eqn

6) $y = 3x - 2$ and $y^2 = x + 4$ about the line y = -4




$$\int_{-2}^{2.333} 2\pi\,(y - -4)\left(\left(\tfrac{1}{3}y + \tfrac{2}{3}\right) - (y^2 - 4)\right)dy$$

355.045