Washer Problems [section 6.2 pg 428-429 # 1-38]

#	region boundary	axis of rev: x-axis	axis of rev: y-axis	axis of rev: x = ?	axis of rev: y = ?	thickness: dx	thickness: dy	radii: outer	radii: inner	definite integral
										$\pi\int_{\text{a}}^{\text{b}}(\text{outer radius}^2-\text{inner radius}^2)\,d\,\text{thickness}$
1	$y=-x+1,\ x=0,\ y=0$	■				✓		$y=-x+1$		$\pi\int_0^1(-x+1)^2dx=\pi\int_0^1 x^2-2x+1\,dx$
2	$y=4-x^2,\ x=0,\ y=0$	■				✓		$y=4-x^2$		$\pi\int_0^2(4-x^2)^2dx=\pi\int_0^2 x^4-8x^2+16\,dx$
3	$y=\sqrt{x}\quad x=1,\ x=4,\ y=0$	■				✓		$y=\sqrt{x}$		$\pi\int_1^4(\sqrt{x})^2dx=\pi\int_1^4 x\,dx$
4	$y=\sqrt{9-x^2},\ x=0,\ y=0$	■				✓		$y=\sqrt{9-x^2}$		$\pi\int_0^3(\sqrt{9-x^2})^2dx=\pi\int_0^3 9-x^2\,dx$
5	$y=x^2,\ y=x^3$	■				✓		$y=x^2$	$y=x^3$	$\pi\int_0^1((x^2)^2-(x^3)^2)dx=\pi\int_0^1 x^4-x^6\,dx$
6	$y=2,\ y=4-\frac{x^2}{4}$	■				✓		$y=4-\frac{x^2}{4}$	2	$\pi\int_{-3}^3(4-\frac{x^2}{4})^2-2^2\,dx=\pi\int_{-3}^3\frac{x^4}{16}-2x^2+12\,dx$
7	$y=x^2,\ x=0,\ y=4$		■				✓	$x=\sqrt{y}$		$\pi\int_0^4(\sqrt{y})^2dy=\pi\int_0^4 y\,dy$
8	$y=\sqrt{16-x^2},\ x=0,\ y=0$		■				✓	$x=\sqrt{16-y^2}$		$\pi\int_0^4(\sqrt{16-y^2})^2dy=\pi\int_0^4 16-y^2dy$
9	$y=x^{2/3},\ x=0,\ y=1$		■				✓	$x=y^{3/2}$		$\pi\int_0^1(y^{3/2})^2dy\equiv\pi\int_0^1 y^3dy$
10	$x=-y^2+4y,\ y=1,\ x=0$		■				✓	$x=-y^2+4y$		$\pi\int_1^4(-y^2+4y)^2dy=\pi\int_1^4(y^4-8y^3+16y^2)dy$
11a	$y=\sqrt{x},\ y=0,\ x=4$	■				✓		$y=\sqrt{x}$		$\pi\int_0^4(\sqrt{x})^2dx=\pi\int_0^4 x\,dx$
11b	same as 11a		■				✓	4	$x=y^2$	$\pi\int_0^2(4^2-(y^2)^2)dy=\pi\int_0^2 16-y^4\,dy$

Washer Problems [section 6.2 pg 428-429 # 1-38]

#	region boundary	axis of rev: x-axis	axis of rev: y-axis	axis of rev: x = ?	axis of rev: y = ?	thickness: dx	thickness: dy	radii: outer	radii: inner	definite integral: $\pi\int_{\_}^{\_}(\text{outer radius}^2-\text{inner radius}^2)\cdot\text{thickness}$
11c	$y=\sqrt{x}$, $y=0$, $x=4$			4			✓	$4-x=4-y^2$		$\pi\int_0^2(4-y^2)^2dy=\pi\int_0^2(y^4-8y^2+16)dy$
11d	same as 11c			6			✓	$6-x=6-y^2$	2	$\pi\int_0^2((6-y^2)^2-2^2)dy=\pi\int_0^2(y^4-12y^2+32)dy$
12b	$y=2x^2$, $y=9$, $x=2$	■				✓		$y=2x^2$		$\pi\int_0^2(2x^2)^2dx=\pi\int_0^2 4x^4dx$
12c	same as 12b		■				✓	2	$x=\sqrt{\frac{y}{2}}$	$\pi\int_0^8(2^2-\sqrt{\frac{y}{2}}^2)dy=\pi\int_0^8(\frac{y}{2}-4\sqrt{\frac{y}{2}}+4)dy$
12c	same as 12b				8	✓		8	$8-y=8-2x^2$	$\pi\int_0^2[8^2-(8-2x^2)^2]dx=\pi\int_0^2(-4x^4+32x^2)dx$
12d	same as 12b			2			✓	$2-x=2-\sqrt{\frac{y}{2}}$		$\pi\int_0^8(2-\sqrt{\frac{y}{2}})^2dy=\pi\int_0^8(\frac{y}{2}-2\sqrt{\frac{y}{2}}+4)dy$
13a	$y=x^2$, $y=4x-x^2$	■				✓		$y=4x-x^2$	$y=x^2$	$\pi\int_0^2[(4x-x^2)^2-(x^2)^2]dx=\pi\int_0^2(-8x^3+16x^2)dx$
13b	same as 13a				6	✓		$6-y=6-x^2$	$6-y=6-(4x-x^2)$	$\pi\int_0^2[(6-x^2)^2-(6-(4x-x^2))^2]dx=\pi\int_0^2(8x^3-38x^2+48x)dx$
14a	$y=6-2x-x^2$, $y=x+6$	■				✓		$y=6-2x-x^2$	$y=x+6$	$\pi\int_{-3}^0[(6-2x-x^2)^2-(x+6)^2]dx=\pi\int_{-3}^0(x^4+4x^3-9x^2-36x)dx$
14b	same as 14a				3	✓		$y-3=3-2x-x^2$	$y-3=x+3$	$\pi\int_{-3}^0[(3-2x-x^2)^2-(x+3)^2]dx=\pi\int_{-3}^0(x^4+4x^3-3x^2-18x)dx$
15	$y=x$, $y=3$, $x=0$				4	✓		$4-y=4-x$	1	$\pi\int_0^3(4-x)^2-1^2dx=\pi\int_0^3(x^2-8x+15)dx$
16	$y=\frac{1}{2}x^3$, $y=4$, $x=0$				4	✓		$4-y=4-x^3/2$		$\pi\int_0^2(4-\frac{x^3}{2})^2dx=\pi\int_0^2(\frac{x^6}{4}-4x^3+16)dx$