Math 173 Spring 2008 Ch 6 Handout

Answers

1. and
2.

(a) $\int_0^1 \pi\left[(1+\sqrt{x})^2 - (x^3+1)^2 \right] dx = \int_1^2 2\pi y\left[(y-1)^{1/3} - (y-1)^2 \right] dy$

(b) $\int_0^1 2\pi x\left[(1+\sqrt{x}) - (x^3+1) \right] dx = \int_1^2 \pi\left[(y-1)^{2/3} - (y-1)^4 \right] dy$

(c) $\int_0^1 \pi\left[(2+\sqrt{x})^2 - (x^3+2)^2 \right] dx = \int_1^2 2\pi(1+y)\left[(y-1)^{1/3} - (y-1)^2 \right] dy$

(d) $\int_0^1 \pi\left[(2-x^3)^2 - (2-\sqrt{x})^2 \right] dx = \int_1^2 2\pi (3-y)\left[(y-1)^{1/3} - (y-1)^2 \right] dy$

3.
(a) 16 gm
(b) $8/5, 16/7$
(c) $\frac{96\pi}{5}\ cm^3$

4. $\sqrt{2}(e^{\pi}-1)$

5. Solving $\int_{.2}^{1} kx\,dx = .05$ for k we get $k = \frac{.05}{.48} \approx .1042$

6. $(5+16)(20) + \int_0^{10} .5y\,dy + \int_{10}^{20} .2y\,dy$ =475 ft-lbs

7. If we center the circle (cross section of sphere) at the origin, then the work done is given by the integral $\int_{-4}^{0} 62.4\pi(16-y^2)(5-y)\,dy \approx 54{,}376$ ft-lb