Math1210 Quiz 14 (5.1-5.3) Summer, 2009 Dylan Zwick

Name Dylan Zwick (Solutions) Date 6/9/09

Instructions: Please show all of your work as partial credit will be given where appropriate, **and** there may be no credit given for problems where there is no work shown. All answers should be completely simplified, unless otherwise stated.

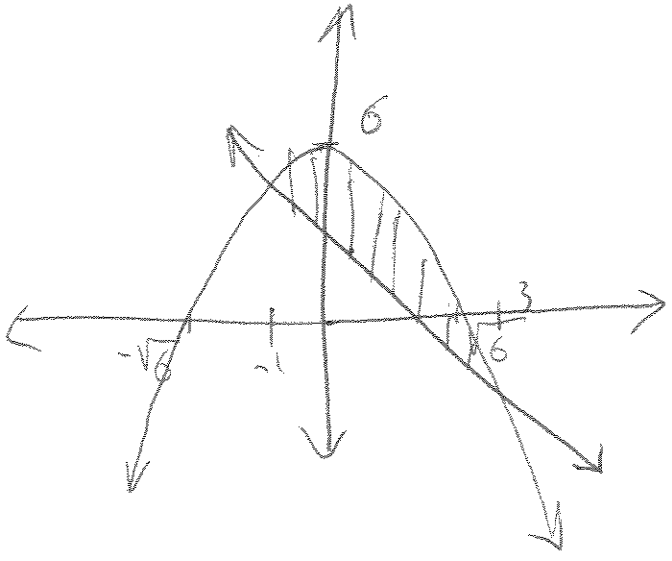
Disk Method

$$V=\pi\int_a^b [f(x)]^2 dx$$

Shell Method

$$V=2\pi\int_a^b x[f(x)]dx$$

1. Find the area of the region bounded by $y=6-x^2$ and $y=3-2x$.



$$6-x^2=3-2x$$

$$0=x^2-2x-3$$

$$=(x-3)(x+1)$$

$$\int_{-1}^{3}[(6-x^2)-(3-2x)]dx$$

$$=\int_{-1}^{3}(3+2x-x^2)dx$$

$$=3x+x^2-\frac{x^3}{3}\Big|_{-1}^{3}$$

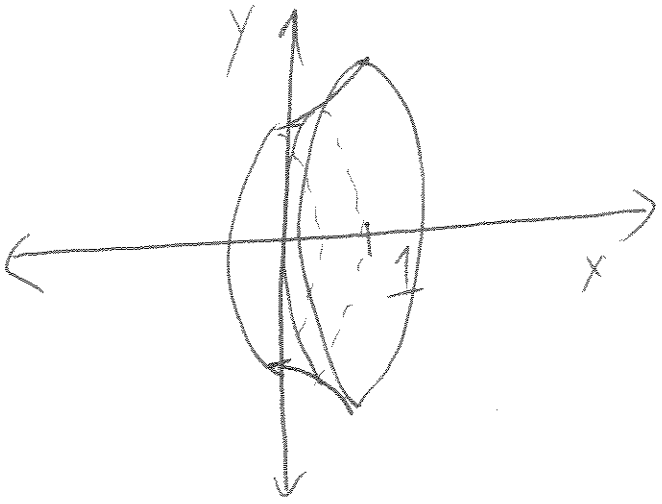
$$=(9+9-9)-(-3+1+\tfrac{1}{3})=9-(-\tfrac{5}{3})=\frac{32}{3}$$

Answer 1: $\boxed{32/3}$

Note: #2 is on the back side!

2. For this problem, **just set up the following volume integrals.** (You do NOT need to evaluate the integrals.)

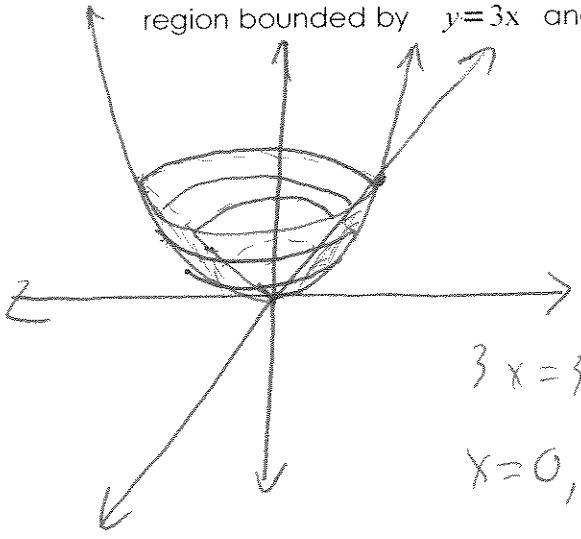
(a) Find the volume integral for the solid generated by revolving about the x-axis the region bounded by $y=\frac{x^2}{5}+2$, $x=1$, and $y=0$.



$$V=\pi\int_0^1\left(\frac{x^2}{5}+2\right)^2dx$$

Answer 2(a): $V=\pi\int_0^1\left(\frac{x^2}{5}+2\right)^2dx$

(b) Find the volume integral for the solid generated by revolving about the y-axis the region bounded by $y=3x$ and $y=3x^4$.



$3x=3x^4$

$x=0,+1$

$$V=2\pi\int_0^1 x(3x-3x^4)dx$$

Answer 2(b): $V=2\pi\int_0^1 x(3x-3x^4)dx$