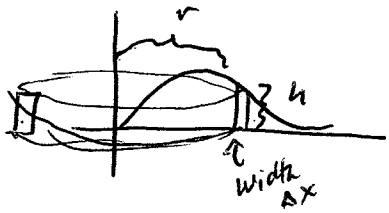
6.3 HW Hints

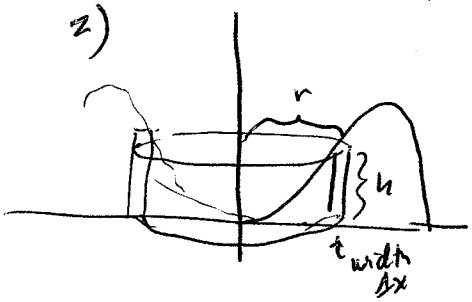
1)



$r = x$

$h = f(x) = x(x-1)^2$

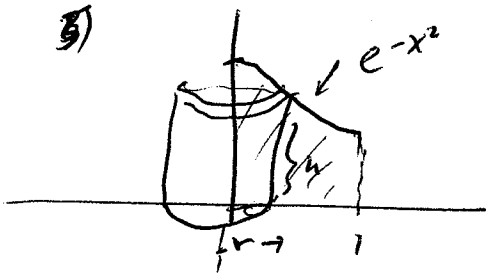
2)



$r = x$

$h = f(x) = \sin(x^2)$

3)

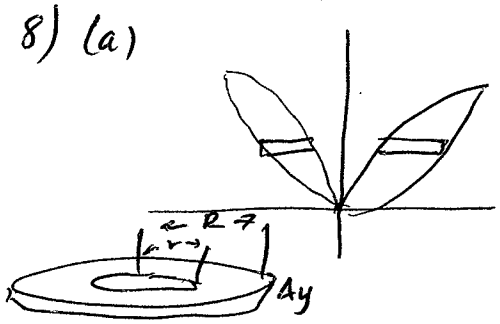


$r = x$

$h = f(x) = e^{-x^2}$

width $= \Delta x$

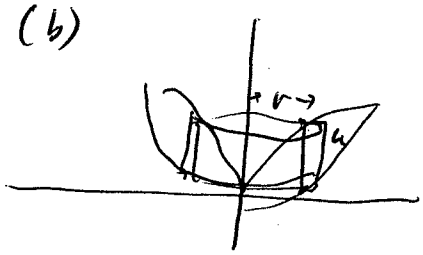
8) (a)



$r = y^2$

$R = \sqrt{y}$

(b)

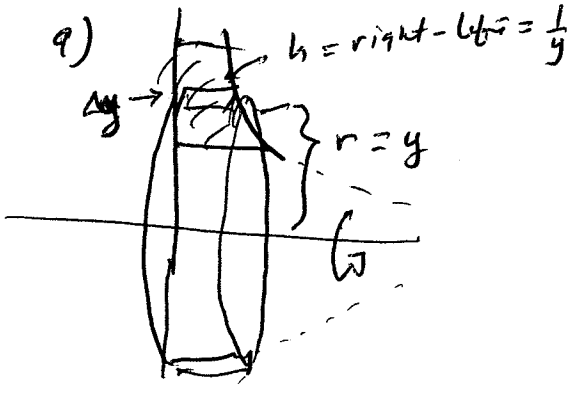


$r = x$

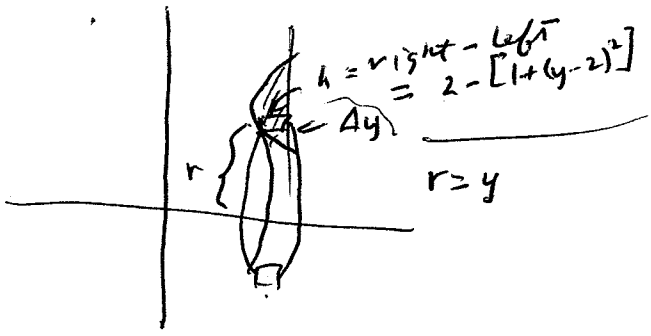
$h = \text{Top} - \text{Bottom} = \sqrt{x} - x^2$

width $= \Delta x$

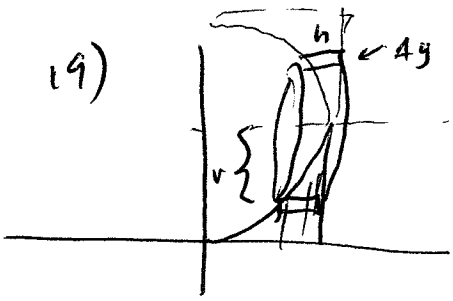
9)



13)

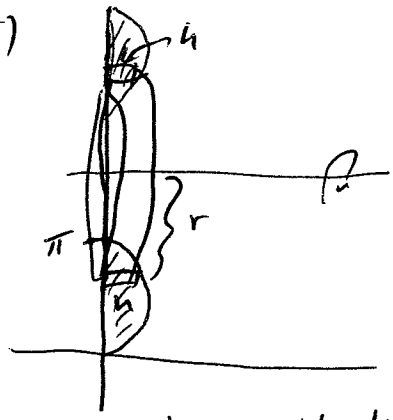


19)



$r = 1-y$, $h = 1-\sqrt[3]{y}$

25)



h = right − left

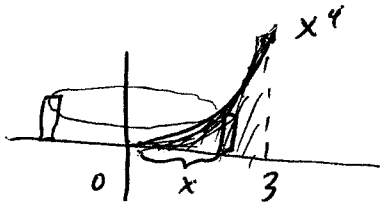
$= \sqrt{\sin y} - 0$

r = top − bottom

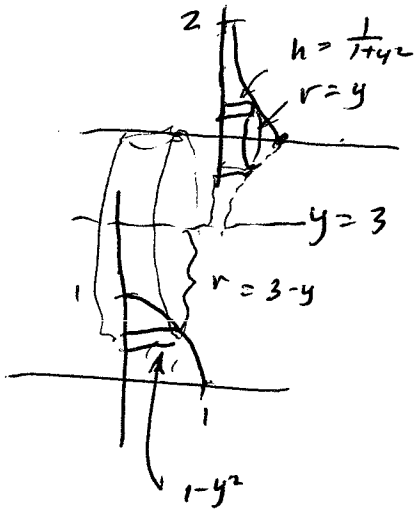
$= 4-y$

29) – 32) All of these have a factor of 2π, so we might use shells for all.

29) $\int_0^3 2\pi x^5\,dx = 2\pi \int_0^3 x \cdot x^4\,dx$

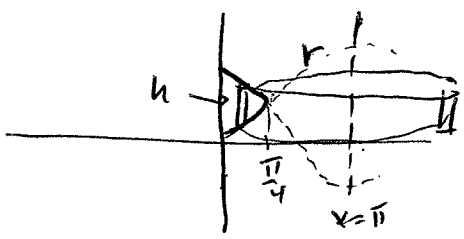


30) $2\pi \int_0^2 \frac{y}{1+y^2}\,dy = 2\pi \int_0^2 y \cdot \frac{1}{1+y^2}\,dy$



31) $2\pi \int_0^1 (3-y)(1-y^2)\,dy$

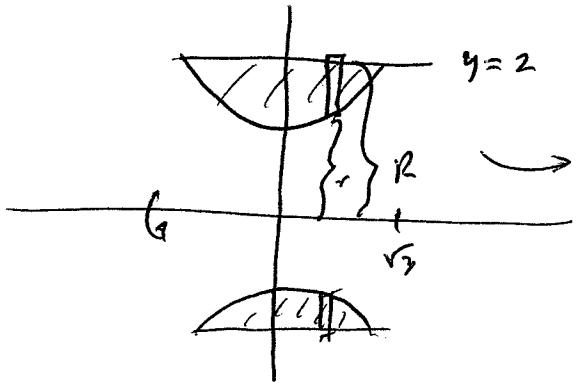
32) $2\pi \int_0^{\pi/4} (\pi - x)(\cos(x) - \sin(x))\,dx$

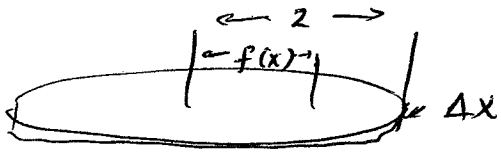


$r = \pi - x$

$h = \cos x - \sin x$

39)



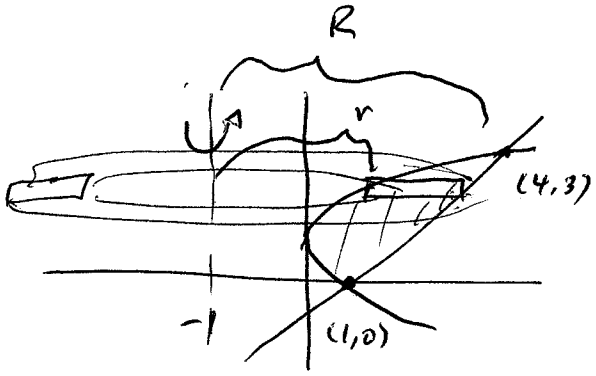


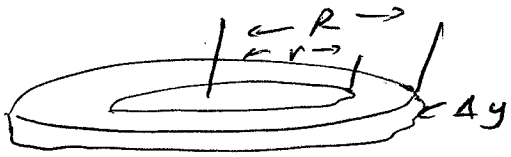
$f(x) = r = \sqrt{x^2+1}$

So $V = 2\int_0^{\sqrt{3}} \pi\left(2^2 - \left(\sqrt{x^2+1}\right)^2\right) dx$

$= 2\pi \int_0^{\sqrt{3}} 3 - x^2\, dx = \ldots$

43)





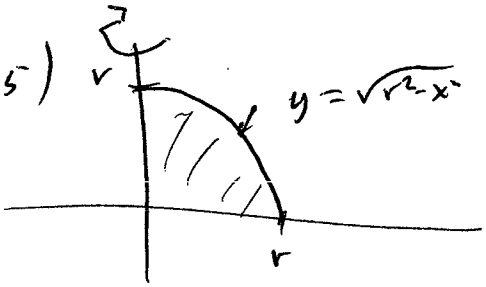
$R = (y+1) - -1 = y+2$

$r = (y-1)^2 - (-1)$

$= (y^2 - 2y + 2)$

(to integrate, multiply it all out ...)

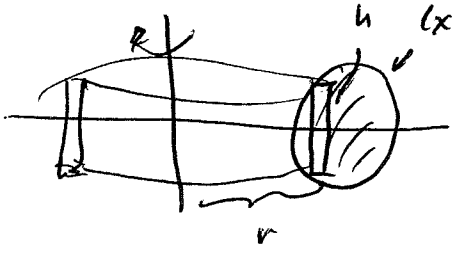
45)



$V = 2\int_0^r 2\pi x \sqrt{r^2 - x^2}\, dx$

(let $u = r^2 - x^2$)

46)



$(x-R)^2 + y^2 = r^2$

$V = \int_{R-r}^{R+r} 2\pi x \cdot 2\sqrt{r^2 - \underbrace{(x-R)^2}_{u = x-R}}$