

26) Area Between Curves:

$$f(x) = \sqrt[3]{x-1}, g(x) = x-1$$

$$(\sqrt[3]{x-1})^3 = (x-1)^3$$

$$x-1 = x^3 - 3x^2 + 3x - 1$$

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

$$0 = x(x^2 - 3x + 2)$$

$$0 = x(x-2)(x-1)$$

$$\int_0^1 g(x) - f(x) dx + \int_1^2 f(x) - g(x) dx$$

$$f\left(\frac{1}{2}\right) = -.79 \quad g\left(\frac{1}{2}\right) = -\frac{1}{2}$$

$$f\left(\frac{3}{2}\right) = .79 \quad g\left(\frac{3}{2}\right) = \frac{1}{2}$$

$$A = \frac{1}{2}$$

30) Area Between Curves:

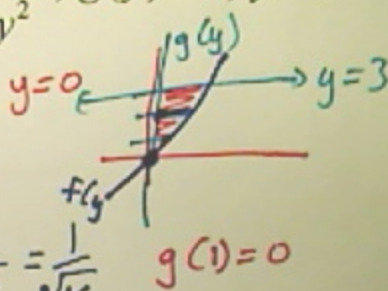
$$f(y) = \frac{y}{\sqrt{16-y^2}}, g(y) = 0, y=3$$

$$\frac{y}{\sqrt{16-y^2}} = 0$$

$$f(1) = \frac{1}{\sqrt{16-1^2}} = \frac{1}{\sqrt{15}}$$

$$\int_0^3 (f(y) - g(y)) dy$$

$$A = 4 - \sqrt{7}$$



14) $y = 6 - 2x - x^2$ (Top), $y = x + 6$ (Bottom)

a) x-axis

$$6 - 2x - x^2 = x + 6 \quad (x = 0 \text{ and } -3)$$

$$0 = x^2 + 3x \quad 0 = x(x + 3)$$

$$y(-1) = 6 - 2(-1) - (-1)^2 = 7$$

6+2 -1

$$y(-1) = -1 + 6 = 5$$

$$V = \pi \int_{-3}^0 (6 - 2x - x^2)^2 - (x + 6)^2 dx$$

$$V = \frac{243\pi}{5}$$

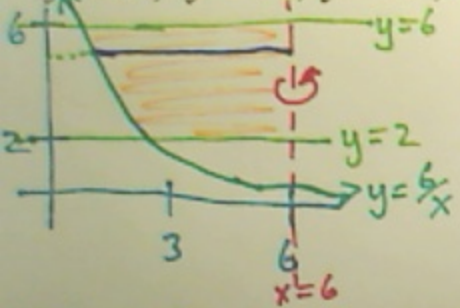
b) y = 3

$$V = \pi \int_{-3}^0 ((6 - 2x - x^2) - 3)^2 - ((x + 6) - 3)^2 dx$$

$$V = \frac{108\pi}{5}$$

22) Volume by revolving around $x=6$:

$xy=6, y=2, y=6, x=6$

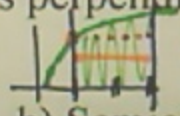


$$V = \pi \int_2^6 \left(6 - \frac{6}{y}\right)^2 dy$$

$$V = 76.899\pi$$

Volume by creating cross sections perpendicular to the y-axis:

$y = 3 + \ln x, y = 0, x = 1, x = 3$



$y(1) = 3 + \ln 1 = 3$
 $y(3) = 3 + \ln 3$

a) Squares: $y - 3 = \ln x$

b) Semicircles:

$x = e^{y-3}$

$A = \frac{\pi d^2}{8}$

$$V = \int_0^3 (2)^2 dy + \int_3^{3+\ln 3} (3 - e^{y-3})^2 dy$$

$$V = \pi \left(\int_0^3 \frac{8}{8} dy + \int_3^{3+\ln 3} \frac{8}{8} (3 - e^{y-3})^2 dy \right)$$