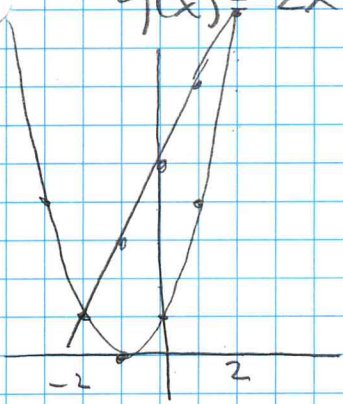


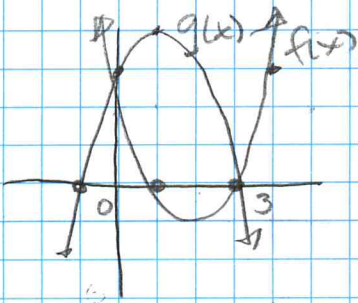
1) $f(x) = x^2 + 2x + 1 = (x+1)^2$
 $g(x) = 2x + 5$



$$\int_{-2}^2 ((2x+5) - (x+1)^2) dx = \left(x^2 + 5x - \frac{(x+1)^3}{3} \right) \Big|_{-2}^2$$

$$= 4 + 10 - \frac{27}{3} - \left(4 - 10 + \frac{1}{3} \right) = 20 - \frac{28}{3} - \frac{32}{3}$$

2) $f(x) = x^2 - 4x + 3 = (x-3)(x-1)$
 $g(x) = -x^2 + 2x + 3 = -(x^2 - 2x - 3) = -(x-3)(x+1)$

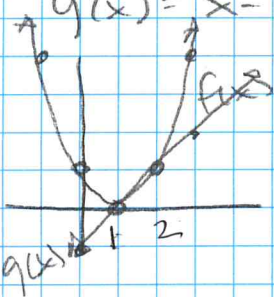


$$\int_0^3 [-x^2 + 2x + 3 - (x^2 - 4x + 3)] dx$$

$$= \int_0^3 (-2x^2 + 6x) dx = -\frac{2x^3}{3} + 3x^2 \Big|_0^3$$

$$= -\frac{27}{3} + 27 - 0 = \frac{2}{3} \cdot 27 = 18$$

3) $f(x) = (x-1)^2$
 $g(x) = x-1$



$$\int_0^2 ((x-1) - (x-1)^2) dx = \left(\frac{(x-1)^2}{2} - \frac{(x-1)^3}{3} \right) \Big|_0^2$$

$$= \frac{1}{2} - \frac{1}{3} - 0 = \frac{1}{6}$$

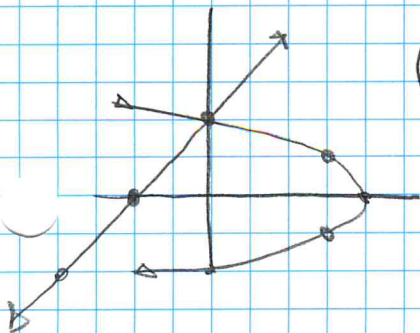
4) $x = 4 - y^2$
 $x = y - 2$

$$4 - y^2 = y - 2$$

$$y^2 + y - 6 = 0$$

$$(y+3)(y-2) = 0$$

$$y = -3, 2$$



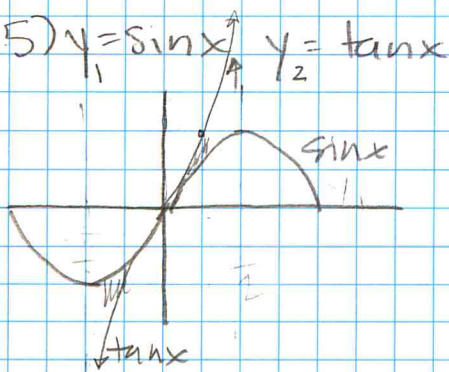
$$\int_{-3}^2 (4 - y^2 - (y - 2)) dy$$

$$= \int_{-3}^2 (-y^2 - y + 6) dy$$

$$= -\frac{y^3}{3} - \frac{y^2}{2} + 6y \Big|_{-3}^2$$

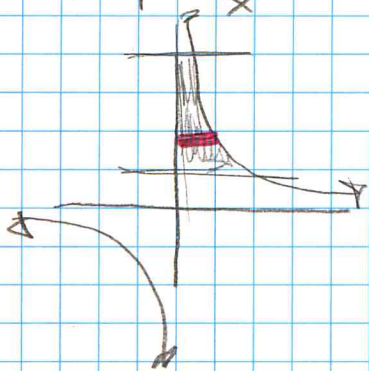
$$= -\frac{8}{3} - \frac{4}{2} + 12 - \left(\frac{27}{3} - \frac{9}{2} - 18 \right) = \frac{125}{6}$$

$$5) y_1 = \sin x \quad y_2 = \tan x$$



$$2 \int_0^{\pi/3} (\tan x - \sin x) dx = 3863$$

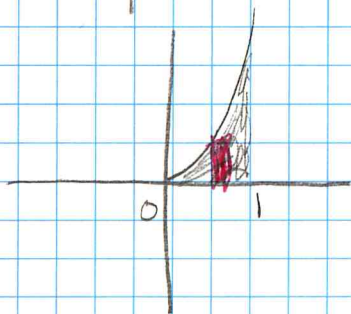
$$6) y = \frac{10}{x} \Rightarrow x = \frac{10}{y}$$



$$\int_2^{10} \frac{10}{y} dy = 10 \ln y \Big|_2^{10}$$

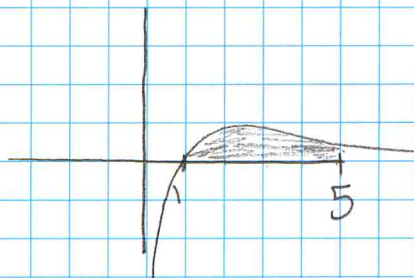
$$= 10 \ln 10 - 10 \ln 2 = 16.094$$

$$7) y = \sqrt{x} e^x$$



$$\int_0^1 \sqrt{x} e^x dx = 1.256$$

$$8) y = \frac{4 \ln x}{x}$$



$$\int_1^5 \frac{4 \ln x}{x} dx = \frac{4 (\ln x)^2}{2} \Big|_1^5$$

$$= 2 (\ln 5)^2 - 2 (\ln 1)^2 = 2 (\ln 5)^2 = 5.181$$

$$9) \int_1^4 2\pi (\sqrt{x})^2 dx = \pi x^2 \Big|_1^4 = 16\pi - \pi = 15\pi$$

$$10) \pi \int_{-3}^3 \left(\left(4 - \frac{x^2}{4} \right)^2 - 2^2 \right) dx = \pi \int_{-3}^3 \left(16 - 2x^2 + \frac{x^4}{16} - 4 \right) dx$$

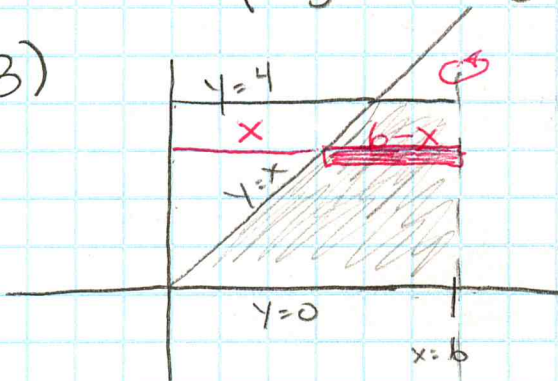
$$= \frac{2643}{40} \pi \approx 207.581$$

$$11) \pi \int_0^1 \left(y^{3/2} \right)^2 dy = \pi \int_0^1 y^3 dy = \pi \frac{y^4}{4} \Big|_0^1 = \frac{\pi}{4} - 0 = \frac{\pi}{4}$$

$$12) \pi \int_1^4 (-y^2 + 4y) dy = \pi \left(-\frac{y^3}{3} + 2y^2 \right) \Big|_1^4 = \pi \left(-\frac{4^3}{3} + 32 - \left(-\frac{1}{3} + 2 \right) \right)$$

$$= \pi \left(-\frac{64}{3} + 32 + \frac{1}{3} - 2 \right) = \pi \left(30 - \frac{63}{3} \right) = \pi (30 - 21) = 9\pi$$

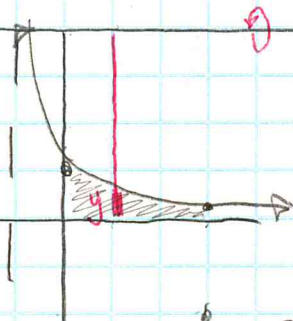
13)



$$\pi \int_0^4 (b-x)^2 dy = \pi \int_0^4 (b-y)^2 dy$$

$$= \pi \frac{(b-y)^3}{3} \Big|_0^4 = -\frac{\pi}{3} (8 - b^3) = \frac{208\pi}{3}$$

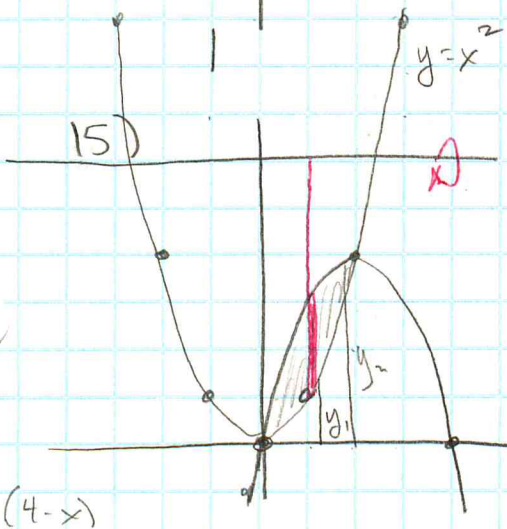
14)



$$\pi \int_0^3 \left(4^2 - \left(4 - \frac{4}{1+x} \right)^2 \right) dx = \pi \int_0^3 \left(16 - \left(4 - \frac{4}{1+x} \right)^2 \right) dx$$

$$= 84.109$$

15)

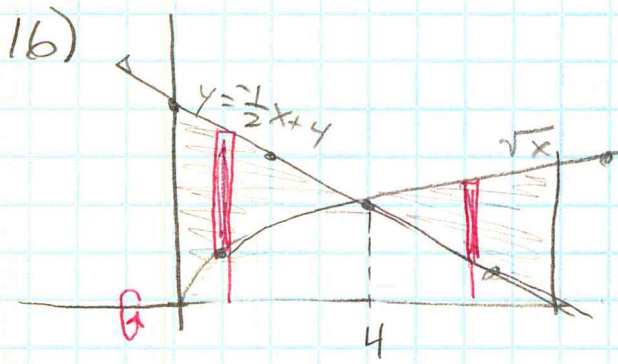


$$\pi \int_0^2 \left[(b-y_1)^2 - (b-y_2)^2 \right] dx$$

$$= \pi \int_0^2 \left[(6-x^2)^2 - (6-(4x-x^2))^2 \right] dx$$

$$= \frac{496\pi}{15} = 103.882$$

 $x(4-x)$



$$\pi \int_0^4 \left(\left(-\frac{1}{2}x + 4 \right)^2 - x \right) dx + \pi \int_4^8 \left(x - \left(-\frac{1}{2}x + 4 \right)^2 \right) dx$$

$$= 92.153 + 58.643$$

$$= \boxed{150.796}$$