Tarea 8

1: ~~$y = x^2$ $x = 0$ $y = 1$ $x = 1$~~

$$\int_1^8 \left(\sqrt[3]{x} + \frac{1}{x}\right) dx$$

$$= \left[\frac{3x^{4/3}}{4} + \ln|x|\right]_1^8 = (9.9705) - \left(\frac{3}{4}\right) = \boxed{9.1705}$$

2: $\int_0^1 e^x - x e^{x^2} dx = \int_0^1 e^x - \frac{1}{2}\int_0^1 e^u du$

$u = x^2$

$du = 2x dx \quad \frac{du}{2} = x dx$

$$= [e^x]_0^1 - \frac{1}{2}[e^{x^2}]_0^1$$

$$= (2.7182 - 1) - \frac{1}{2}(2.7182 - 1) = \boxed{0.8591}$$

3: $\int_{-1}^{1} e^y - (y^2 - 2)\, dy = \int_{-1}^{1} (e^y - y^2 + 2)\, dy$

$$= \left[e^y - \frac{y^3}{3} + 2y\right]_{-1}^{1} = (4.3849 - (-1.2987))$$

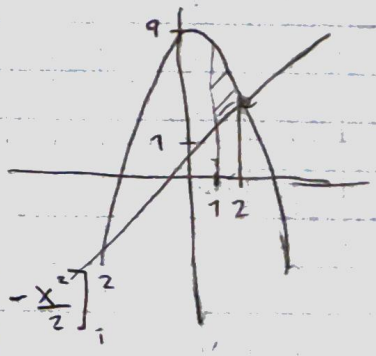
$$= \boxed{5.6836}$$

4: $\int_0^3 (2y - y^2 - (y^2 - 4y))\, dy = \int_0^3 (6y - 2y^2)\, dy$

$$= \left[3y^2 - \frac{2y^3}{3}\right]_0^3 = (9 - 0) = \boxed{9}$$

1: $y = x + 1 \quad x = 1$

$y = 9 - x^2 \quad x = 2$



$$\int_1^2 (9 - x^2) - (x + 1)\, dx$$

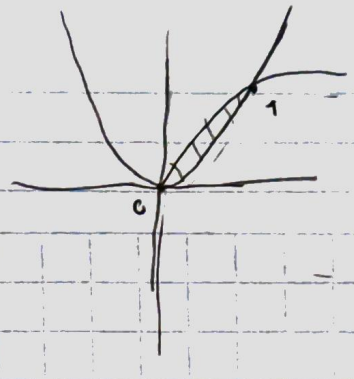
$$\int_1^2 8 - x^2 - x\, dx = \left[8x - \frac{x^3}{3} - \frac{x^2}{2}\right]_1^2$$

$$= \frac{34}{3} - \frac{43}{6} = \boxed{\frac{25}{6}}$$

2: $y = x^2$

$y^2 = x$

$y = \sqrt{x}$



$\sqrt{x} = x^2$

$x^2 - \sqrt{x} = 0$

$\sqrt{x}(x^4 - 1) = 0$

$\sqrt{x} = 0 \quad x^4 - 1 = 0$

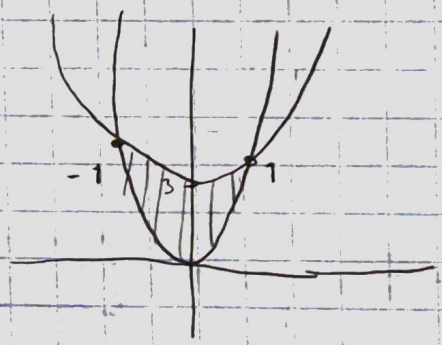
$x = 0 \quad x^4 = 1$

$x = 1$

$$\int_0^1 (\sqrt{x} - x^2)\,dx = \left[\frac{2x^{3/2}}{3} - \frac{x^3}{3}\right]_0^1 = \frac{1}{3} - 0 = \boxed{\frac{1}{3}}$$

3: $y = 4x^2$

$y = x^2 + 3$



$4x^2 = x^2 + 3$

$3x^2 = 3$

$x^2 = 1$

$x = \sqrt{1}$

$x_1 = 1$

$x_2 = -1$

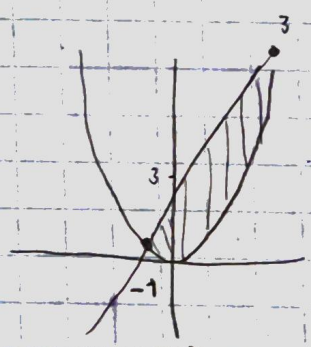
$$\int_{-1}^{1} (x^2 + 3) - (4x^2)\,dx = \int_{-1}^{1} (-3x^2 + 3)\,dx = \left[-x^3 + 3x\right]_{-1}^{1}$$

$$= 2 - (-2) = \boxed{4}$$

4: $y^2 = x$

$x - 2y = 3$

$x = 2y + 3$



$y^2 = 2y + 3$

$y^2 - 2y - 3 = 0$

$(y - 3)(y + 1) = 0$

$y_1 = 3 \quad y_2 = -1$

$$\int_{-1}^{3} ((2y + 3) - (y^2))\,dy = \int_{-1}^{3} (-y^2 + 2y + 3)\,dy = \left[-\frac{y^3}{3} + y^2 + 3y\right]_{-1}^{3}$$

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

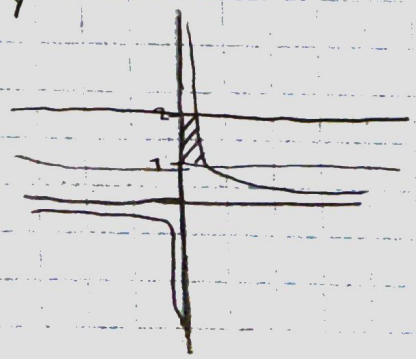
$x = \frac{1}{y}$

5: $y = \frac{1}{x}$

$x = 0$

$y = 1$

$y = 2$



$$\int_1^2 \left(\frac{1}{y}\right) dy = \left[\ln(y)\right]_1^2$$

$$= 0.6931 - 0 = 0.6931$$

$$\boxed{0.6931}$$