1°

$$\int \frac{2x^2+2x-1}{x^3-x^2}\,dx = \int \frac{2x^2+2x-1}{x^2\cdot(x-1)}\,dx = \int\left(\frac{A}{x^2}+\frac{B}{x}+\frac{C}{x-1}\right)dx =$$

$$= \int \frac{1}{x^2}\,dx - \int \frac{1}{x}\,dx + \int \frac{3}{x-1}\,dx =$$

$$= \int x^{-2}dx - \ln|x| + 3\ln|x-1| =$$

$$= \boxed{-\frac{1}{x} - \ln|x| + 3\ln|x-1| + C}$$

Cálculo de A, B, C:

$2x^2+2x-1 = A(x-1) + Bx(x-1) + Cx^2$

$x=0 \rightarrow -A=-1 \Rightarrow A=1$

$x=1 \rightarrow 3=C$

$x=-1 \rightarrow -1=-2+2B+3 \rightarrow B=-1$

2°

$$\int x^2\cdot(\ln x)^2dx = (\ln x)^2\cdot\frac{x^3}{3} - \int \frac{x^3}{3}\cdot\frac{2\ln x}{x}\,dx = \frac{(\ln x)^2\cdot x^3}{3} - \int \frac{2\ln x}{3}\cdot x^2dx$$

$u=(\ln x)^2 \rightarrow du = \frac{2\ln x}{x}dx$

$v = x^2dx \Rightarrow v = \frac{x^3}{3}$

$$= \frac{(\ln x)^2\cdot x^3}{3} - \int \frac{2x^2}{3}\cdot \ln x\cdot dx =$$

$u = \ln x \rightarrow du = \frac{1}{x}\,dx$

$v = \frac{2x^2}{3}dx \rightarrow v = \frac{2}{3}\cdot\frac{x^3}{3} = \frac{2x^3}{9}$

$$= \frac{(\ln x)^2\cdot x^3}{3} - \left[\frac{2x^3\ln x}{9} - \int \frac{2x^3}{9}\cdot\frac{1}{x}\,dx\right] =$$

$$\frac{x^3(\ln x)^2}{3} - \frac{2x^3\ln x}{9} + \frac{2}{9}\int x^2dx = \boxed{\frac{2x^3\cdot\ln x}{3} - \frac{2x^3\cdot\ln x}{9} + \frac{2x^3}{27} + C}$$

3°

$$\int \frac{\operatorname{sen}^3 x}{\cos^2 x}\,dx = \int \frac{\operatorname{sen}^3 x}{t^2}\cdot\frac{-dt}{\operatorname{sen} x} = \int \frac{-\operatorname{sen}^2 x}{t^2}\cdot dt = -\int \frac{1-t^2}{t^2}\,dt$$

$\cos x = t \rightarrow -\operatorname{sen} x\,dx = dt$

$dx = \frac{-dt}{\operatorname{sen} x}$ $\quad \operatorname{sen}^2 x = 1-\cos^2 x = 1-t^2$

$$= -\int\left(\frac{1}{t^2}-1\right)dt = -\int(t^{-2}-1)\,dt =$$

$$= -\left[\frac{t^{-1}}{-1}-t\right] = t^{-1}+t = \frac{1}{t}+t =$$

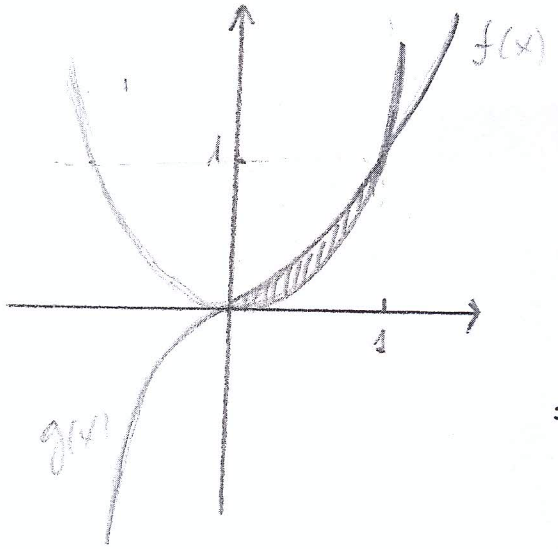
$$= \boxed{\frac{1}{\cos x} + \cos x + C}$$

4°

$$\int \frac{(x-1)^2}{\sqrt{x}}\,dx = \int \frac{x^2-2x+1}{\sqrt{x}}\,dx = \int\left(\frac{x^2}{\sqrt{x}} - \frac{2x}{\sqrt{x}} + \frac{1}{\sqrt{x}}\right)dx =$$

$$= \int \left(x^{3/2} - 2x^{1/2} + x^{-1/2}\right)dx = \boxed{\frac{2}{5}x^{5/2} - \frac{4}{3}x^{3/2} + 2x^{1/2} + C}$$

5°



$f(x) = g(x) \rightarrow x=0,\ x=1$

$$\text{Área} = \int_0^1 (x^2 - x^3)\,dx = \left.\frac{x^3}{3} - \frac{x^4}{4}\right]_0^1 =$$

$$= \left(\frac{1}{3} - \frac{1}{4}\right) - (0) = \boxed{\frac{1}{12}\,u^2}$$

6°

$f(x) = g(x) \Rightarrow x^3 - x^2 + 2 = -x^2 + x + 2 \Rightarrow x^3 - x = 0 \Rightarrow x = 0, 1, -1$

$$A = \int_{-1}^0 (f(x) - g(x))\,dx + \int_0^1 (g(x) - f(x))\,dx$$

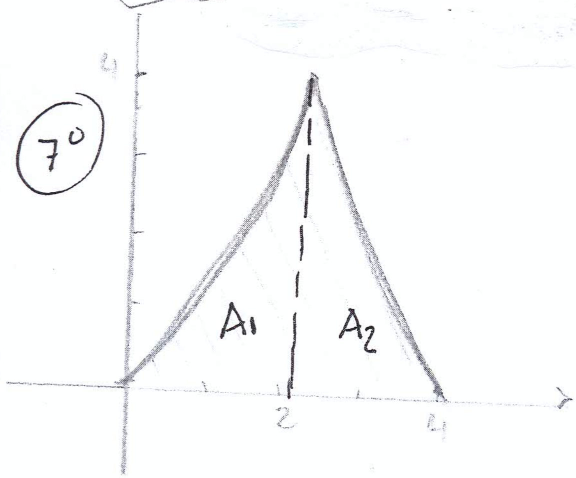
$f\left(\frac{1}{2}\right) = -\frac{1}{3}$

$g\left(\frac{1}{2}\right) = \frac{1}{4}$

$$= \int_{-1}^0 (x^3 - x)\,dx + \int_0^1 (x - x^3)\,dx = \left.\frac{x^4}{4} - \frac{x^2}{2}\right]_{-1}^0 + \left.\frac{x^2}{2} - \frac{x^4}{4}\right]_0^1 =$$

$$= \boxed{\frac{1}{2}\,u^2}$$

7°



$f(x) = g(x) \rightarrow x = 2 \rightarrow A = A_1 + A_2$

$$A_1 = \int_0^2 x^2\,dx = \left.\frac{x^3}{3}\right]_0^2 = \frac{8}{3}\,u^2$$

$$A_2 = \int_2^4 (x^2 - 8x + 16)\,dx = \left[\frac{x^3}{3} - 4x^2 + 16x\right]_2^4 = \frac{8}{3}\,u^2$$

$$\boxed{A_T = \frac{16}{3}\,u^2}$$