

$$8 \text{ a)} \quad \int \frac{e^x}{1+e^{2x}} = \int \frac{1}{4} \frac{e^x}{1+\left(\frac{e^x}{2}\right)^2} = \frac{1}{2} \arctan(e^x)$$

$$8 \text{ b)} \quad \int \frac{3x^2+x+4}{(x+1)^2(x-2)} = \int \frac{A_1}{(x+1)^2} + \int \frac{A_2}{x+1} + \int \frac{B}{x-2} =$$

função racional própria
decompor em frações simples

$$= A_1 \frac{1}{x+1} + A_2 \ln|x+1| + B \ln|x-2|$$

A determinar das constantes A_1, A_2 e B
pode-se fazer resolver de equações

$$3x^2+x+4 = A_1(x-2) + A_2(x+1)(x-2) + B(x+1)^2$$

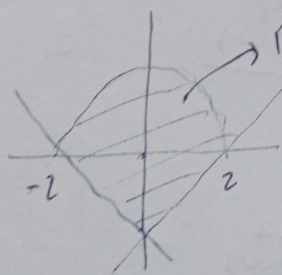
de soluções $A_1 = -2$, $A_2 = 1$ e $B = 2$

9. Usando a integral por partes

$$\int_0^{\frac{1}{2}} \arcsin x \, dx = \left[x \arcsin x \right]_0^{\frac{1}{2}} - \int_0^{\frac{1}{2}} \frac{x}{\sqrt{1-x^2}} \, dx =$$

$$= \frac{1}{2} \cdot \frac{\pi}{6} + \left[\sqrt{1-x^2} \right]_0^{\frac{1}{2}} = \frac{\pi}{12} + \left(\sqrt{3/4} - 1 \right)$$

10.



$$\text{área } R = 2 \int_0^2 \left((4-x^2) - (x-2) \right) dx$$

$$= 2 \left[6x - \frac{x^3}{3} - \frac{x^2}{2} \right]_0^2 =$$

$$= 2 \left(12 - \frac{8}{3} - \frac{4}{2} \right) = \frac{44}{3}$$

(5)