

Soluções da Ficha1:

$$1.a) -\frac{\pi}{4} \quad b) -\pi \quad c) \frac{\sqrt{3}}{2} \quad d) -\frac{\sqrt{3}}{3} \quad e) -\frac{3}{4} \quad f) -\frac{5}{13} \quad g) \frac{5\sqrt{3}-4}{2\sqrt{41}} \quad h) \frac{4+3\sqrt{3}}{10}$$

$$2.a) \frac{4\pi}{3} \quad b) \frac{1}{3} \quad c) -\frac{175}{144}$$

$$3.a) D_f = [0, 1] \quad D'_f = [0, 2\pi]$$

$$f^{-1} : [0, 2\pi] \rightarrow [0, 1]$$

$$x \mapsto \frac{1}{2} + \frac{1}{2} \sin\left(\frac{x}{2} - \frac{\pi}{2}\right)$$

$$b) D_g = [0, \frac{1}{2}] \quad D'_g = [-1, 3\pi - 1]$$

$$g^{-1} : [-1, 3\pi - 1] \rightarrow [0, \frac{1}{2}]$$

$$x \mapsto \frac{1}{4} - \frac{1}{4} \cos\left(\frac{x}{3} + \frac{1}{3}\right)$$

$$c) D_h =]-\infty, -5] \cup [1, +\infty[\quad D'_h = \left[\frac{\pi}{2}, \frac{5\pi}{2}\right] \setminus \left\{\frac{3\pi}{2}\right\}$$

$$h^{-1} : \left[\frac{\pi}{2}, \frac{5\pi}{2}\right] \setminus \left\{\frac{3\pi}{2}\right\} \rightarrow]-\infty, -5] \cup [1, +\infty[$$

$$x \mapsto -2 + \frac{3}{\cos\left(\frac{x}{2} - \frac{\pi}{4}\right)}$$

$$d) D_i = \mathbb{R} \setminus \{-5\} \quad D'_i =]-\frac{\pi}{6}, \frac{5\pi}{6}[\setminus \left\{\frac{\pi}{3}\right\}$$

$$i^{-1} :]-\frac{\pi}{6}, \frac{5\pi}{6}[\setminus \left\{\frac{\pi}{3}\right\} \rightarrow \mathbb{R} \setminus \{-5\}$$

$$x \mapsto -5 + \frac{1}{\tan\left(x - \frac{\pi}{3}\right)}$$

$$4.a) \frac{\pi}{3} \quad b) D_p = [-2, 0] \quad c) D'_p = \left[-\frac{5\pi}{3}, \frac{\pi}{3}\right] \quad c)x = \frac{-2+\sqrt{3}}{2}$$

$$d)i^{-1} : \left[-\frac{5\pi}{3}, \frac{\pi}{3}\right] \rightarrow [-2, 0]$$

$$x \mapsto -1 + \cos\left(-\frac{x}{2} + \frac{\pi}{6}\right)$$

$$e)[-2, -\frac{1}{2}]$$

$$5.a) f'(x) = \arcsin(4x) + \frac{4x}{\sqrt{1-(4x)^2}} \quad b) g'(t) = \frac{14 \arctg(7t)}{1+49t^2}$$

$$c) h'(y) = \frac{\cos(y)}{2\sqrt{\sin(y)}} + \frac{1}{y^2 \sqrt{1-\frac{1}{y^2}}} \quad d) i'(x) = \frac{-3 \sin(\arctg(3x))}{1+9x^2}$$

$$e) j'(t) = 3 \arcsin(\sqrt{t^2-1}) + \frac{3t^2}{\sqrt{(t^2-1)(2-t^2)}} \quad f) m'(y) = \frac{\tan(y)}{\cos(y)} - \frac{2}{4+y^2}$$

$$6.a) \frac{\pi}{2} \quad b) D_t = \mathbb{R} \setminus \{-1\} \quad D'_t =]-\frac{\pi}{4}, \frac{3\pi}{4}[\setminus \left\{\frac{\pi}{4}\right\} \quad c) x \in]-\infty, -2[\cup]-1, +\infty[$$

$$d) t^{-1} :]-\frac{\pi}{4}, \frac{3\pi}{4}[\setminus \left\{\frac{\pi}{4}\right\} \rightarrow \mathbb{R} \setminus \{-1\}$$

$$x \mapsto -1 + \frac{1}{\tan\left(x - \frac{\pi}{4}\right)}$$

$$e)y = -\frac{x}{2} + \frac{\pi}{2} \quad f) \text{ continua no pto de abcissa } 0$$

$$7.a) \frac{4\pi}{3} \quad b) D_g =]-\infty, -1] \cup [1, +\infty[\quad D'_g =]-\frac{2\pi}{3}, \frac{4\pi}{3}[\setminus \{\frac{\pi}{3}\} \quad c) x \geq 2 \vee x < 0$$

$$d) g^{-1}:]-\frac{2\pi}{3}, \frac{4\pi}{3}[\setminus \{\frac{\pi}{3}\} \rightarrow]-\infty, -1] \cup [1, +\infty[$$

$$x \mapsto \frac{1}{\sin(\frac{x}{2}-\frac{\pi}{6})}$$

$$e)y = -\frac{\sqrt{3}}{3}(x+2).$$