

Ficha Prática 2 – Parte III – Soluções

1. B

2. B

3.

a) -3

b) $\frac{3}{2}$

c) 8

d) -2

4. C

5. C

6. B

7. B

8.

a) $]0, 1[\cup]\frac{3}{2}, 3[$

b) $\{\ln 2\}$

c) $\{-1, 3\}$

d) $1 + \sqrt{2}$

e) $\{2\}$

f) $\left\{\frac{1}{125}\right\}$

g) $] -\infty, 2[$

h) $]0, +\infty[$

i) $]2, 3[\cup]3, +\infty[$

9.

a) $\left\{\ln \sqrt[3]{2}\right\} = \left\{\frac{1}{3} \ln 2\right\}$

b)

$$h^{-1}:]-\infty, 2[\longrightarrow \mathbb{R}$$

$$x \mapsto \ln\left(\sqrt[3]{1-\frac{x}{2}}\right)$$

10.

a) $] -e, e[$

b) 3

c) $\left]-e, -\frac{\sqrt{3}}{2}e\right] \cup \left[\frac{\sqrt{3}}{2}e, e\right[$

11.

a) $-\frac{1}{2}$

b) $-\frac{\sqrt{2}}{2}$

c) $-\sqrt{3}$

d) 1

e) $\frac{\sqrt{3}}{3}$

f) Não está definida

g) $\sqrt{2}$

h) $-\sqrt{2}$

i) 2

j) $-\frac{\pi}{4}$

k) $\frac{\pi}{6}$

l) π

m) $\frac{4\sqrt{15}}{15}$

n) $\frac{\sqrt{13}}{2}$

o) $\frac{2\sqrt{6}}{5}$

p) $-\frac{4+3\sqrt{3}}{10}$

q) $\frac{4+3\sqrt{3}}{10}$

r) $-\frac{\pi}{3}$

s) $-\frac{4\sqrt{2}}{7}$

t) $-\frac{9\sqrt{3}+8\sqrt{2}}{5}$

u) $-\frac{\pi}{2}+\frac{3}{4}$

12.

a) 1

b) $a = 1$ e $b = -4$

13. B

14.

$\arcsen(x) :$ D

$\arccos(x) :$ A

$\arctan(x) :$ C

$\sec(x) :$ B

15.

- a)** $\left\{ \frac{\pi}{2} + k\pi, \frac{5\pi}{6} + k\pi \right\}, k \in \mathbb{Z}$ **b)** $\left\{ \frac{\pi}{10} + \frac{k\pi}{5} \right\}, k \in \mathbb{Z}$ **c)** $\left\{ \frac{\sqrt{3}}{8} \right\}$
d) $\left\{ \frac{3\pi}{8} + k\pi, \frac{5\pi}{8} + k\pi \right\}, k \in \mathbb{Z}$ **e)** $\left\{ \frac{\pi}{15} + \frac{2}{5}k\pi, \frac{2\pi}{15} + \frac{2}{5}k\pi \right\}, k \in \mathbb{Z}$ **f)** $\left\{ \frac{2}{3}k\pi, \pi + 2k\pi \right\}, k \in \mathbb{Z}$
g) $\left\{ \arctg\left(-\frac{9+\sqrt{57}}{4}\right) + k\pi; \arctg\left(\frac{-9+\sqrt{57}}{4}\right) + k\pi \right\}, k \in \mathbb{Z}$
h) $\left\{ \arccos\left(\frac{1}{\sqrt{3}}\right) + k\pi; \arccos\left(-\frac{1}{\sqrt{3}}\right) + k\pi; \arccos\left(\sqrt{\frac{3}{5}}\right) + k\pi; \arccos\left(-\sqrt{\frac{3}{5}}\right) + k\pi \right\}$
i) $\left\{ \frac{\sqrt{3}}{2} \right\}$ **j)** $\{-10\}$ **k)** $\{1\}$ **l)** $\{-1\}$

16.
$$\frac{4\sqrt{3} - 3 + \sqrt{10}}{10}$$

17.

- a)** $\left] \frac{\pi}{3}, \pi \right[\cup \left] \frac{5\pi}{3}, 2\pi \right[$
b) $\left] \frac{\pi}{3}, \frac{2\pi}{3} \right[\cup \left] \frac{4\pi}{3}, \frac{5\pi}{3} \right[$
c) $] -2, 1[$

18. D

19. C

20.

- a)** $\left] -\frac{\pi}{6}, \frac{\pi}{6} \right[$
b) $\left\{ \frac{\pi}{2} + k\pi \right\}, k \in \mathbb{Z}$

21.

$$\text{a)} \quad D = \mathbb{R} \setminus \left\{ \frac{\pi}{4} + k \frac{\pi}{3}, k \in \mathbb{Z} \right\} \quad D' =]-\infty, -1] \cup [1, +\infty[$$

$$\begin{aligned} \text{b)} \quad f^{-1}:]-\infty, -1] \cup [1, +\infty[&\longrightarrow \left[\frac{\pi}{12}; \frac{5\pi}{12} \right] \setminus \left\{ \frac{\pi}{4} \right\} \\ x &\mapsto \frac{1}{3} \arccos\left(\frac{1}{x}\right) + \frac{\pi}{12} \end{aligned}$$

22.

$$\text{a)} \quad D = \left[-\frac{1}{2}, \frac{1}{2} \right] \quad D' = \left[-\frac{5\pi}{4}, \frac{7\pi}{4} \right]$$

$$\begin{aligned} \text{b)} \quad f^{-1}: \left[-\frac{5\pi}{4}, \frac{7\pi}{4} \right] &\longrightarrow \left[-\frac{1}{2}, \frac{1}{2} \right] \\ x &\mapsto \frac{1}{2} \operatorname{sen}\left(\frac{\pi}{12} - \frac{x}{3}\right) \end{aligned}$$

$$\text{c)} \quad \frac{1}{2} \operatorname{sen}\left(\frac{\pi}{12}\right)$$

$$\text{d)} \quad A = \{0\}$$

23.

$$\text{b)} \quad D' = [-\pi, \pi]$$

$$\begin{aligned} \text{c)} \quad f^{-1}: [-\pi, \pi] &\longrightarrow [0, \sqrt{3}] \\ x &\mapsto \sqrt{1 - 2 \cos\left(\frac{2\pi - x}{3}\right)} \end{aligned}$$

$$\text{d)} \quad A = [-\sqrt{3}, -1] \cup [1, \sqrt{3}]$$

24.

$$\text{a)} \quad D = \mathbb{R} \quad D' =]0, 2\pi[$$

$$\begin{aligned} \text{c)} \quad f^{-1}:]0, 2\pi[&\longrightarrow \mathbb{R} \\ x &\mapsto \frac{1}{2} \left[\tan\left(\frac{\pi - x}{2}\right) - 1 \right] \end{aligned}$$

25.

a) $D = \mathbb{R} \setminus \left\{ \frac{\pi}{2} + k\pi, k \in \mathbb{Z} \right\}$

26.

a) $\left\{ k\pi, \frac{2\pi}{3} + 2k\pi, \frac{4\pi}{3} + 2k\pi \right\}, k \in \mathbb{Z}$

b) $(f \circ g)(x) = \frac{1}{2} - \sin(2 \arccos(x-1)) = \frac{1}{2} - 2(x-1)\sqrt{1-(x-1)^2}$

$$(f \circ g)\left(\frac{1}{3}\right) = \frac{1}{2} + \frac{4\sqrt{5}}{9}$$

c) $g^{-1}: [0, 2\pi] \longrightarrow [0, 2]$
$$x \mapsto \cos\left(\frac{x}{2}\right) + 1$$

27.

a) $\frac{\pi}{6}$

b) $\frac{\pi}{6}$

c) $\frac{\pi}{6}$