Exercise 1 –

1. Use a calculator to evaluate
$$\arccos(0.1), \arcsin(0.57), \arctan(5).$$

2. Evaluate without a calculator
$$\arcsin\left(-\frac{1}{2}\right), \arccos\left(\frac{\sqrt{2}}{2}\right), \arctan\left(\sqrt{3}\right).$$

3. What is the exact value of
$$\arcsin\left(\frac{1}{2}\tan\left(-\frac{4\pi}{3}\right)\right), \arctan\left(2\sin\left(\frac{4\pi}{3}\right)\right), \arccos\left(\cos\left(\frac{7\pi}{4}\right)\right)?$$

Exercise 2 – Simplify the following expressions
$$\begin{array}{ll}
\sin\left(\arccos(x)\right), & \cos\left(2\arcsin(x)\right) \\
\sin\left(\arctan(x)\right), & \arcsin(x) + \arccos(x) \\
\arccos(x) + \arccos(-x), & \arctan(x) + \arctan\left(\frac{1}{x}\right).
\end{array}$$

Exercise 3 – Solve the following equations
$$\arcsin(2x) + \arcsin(x) = \frac{\pi}{4}, \arccos(x) = 2\arccos\left(\frac{3}{4}\right).$$

Exercise 4 – Study the variation of the functions
$$f(x) = \arcsin\left(\frac{1}{x}\right), g(x) = \arccos\left(\frac{1-x^2}{1+x^2}\right)$$

and draw there curves.

Exercise 5 – Simplify the expressions
$$\frac{\cosh\left(\ln(x)\right) + \sinh\left(\ln(x)\right)}{x}, \cosh\left(\arg\sinh(x)\right), \sinh\left(2\arg\sinh(x)\right), \tanh\left(\arg\cosh(x)\right).$$

Exercise 6 – Find the Taylor's polynomial of order 3 around $x_0 = 0$ of the functions
$$f_1(x) = \sinh(x), f_2(x) = \cosh(x), f_3(x) = \tanh(x), f_4(x) = \sinh\left(1 + x^2\right).$$

Exercise 7 – Let f be the function defined by
$$f(x) = \arg\cosh\left(\frac{1}{2}\left(x + \frac{1}{x}\right)\right).$$

— Simplify the expression of f.
— Study the variation of f and draw its curve.

Exercise 8 – Find the first derivative of
$$f(x) = \arg\sinh\left(\tan(x)\right), g(x) = \arg\tanh\left(\sin(x)\right).$$