Mohamed-Cherif Messaadia University - Souk-Ahras
Faculty of economic sciences, commerce and management sciences, First year, common trunk (2024-2025)
Third series (Logarithmic and Exponential Functions).

Exercise 1 – Find the domain of definition of the following functions:

1. $f(x) = \frac{5}{4-x}$
2. $g(x) = \sqrt{2x+1}$
3. $h(x) = \frac{3x}{\sqrt{3-x}}$
4. $k(x) = ln(3x^2 - 6)$

Exercise 2 – Solve the following equations in the set of real numbers:

1. $1 - \ln(x+4) = 0$
2. $\ln(x^2) - \ln(x+2) = 0$
3. $\ln(x+6) + \ln(x+7) = \ln(42)$
4. $\ln(2x-1) - \ln(x+1) = \ln(2x)$
5. $(\ln x)^2 - 7\ln(x) + 12 = 0$
6. $16(\ln x)^2 = 81$

Exercise 3 – Solve the following inequalities in the set of real numbers:

1. $\ln(x) > -1$
2. $x\ln(x) - x < 0$
3. $\ln(x+3) \geq 4$
4. $(\ln x)^2 + 3\ln(x) + 4 \leq 0$
5. $\ln(2x-5) \geq 1$
6. $\ln(2x+1) \leq \ln(x+2)$

Exercise 4 – Solve the following equalities in the set of real numbers:

1. $e^x - e^{-x} = \frac{8}{3}$
2. $e^{3x+2} = e$
3. $e^x + 1 = 0$

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4. $e^x - 7 = 0$
5. $e^x\left(e^x - 4\right) = 0$
6. $e^{2x} + e^x - 6 = 0$

Exercise 5 − Solve the following inequalities in the set of real numbers

1. $e^{x-1} < 1$
2. $3(e^x)^2 + e^x - 4 < 0$
3. $e^{x^2} \leq \frac{1}{e^2}$
4. $\frac{e^x-2}{e^x+1} > 0$
5. $e^{2x} - 3e^x < 0$
6. $e^{2x} + e^x - 6 \geq 0$