Final test, Mathematics 0 BPM_MTH0 autumn 2023

Name: ....   University number (UČO): ....

Problem 1: Solve the inequality $x^2 - 5x + 7 \geq 3x$.

Problem 2: Solve the inequality $\dfrac{x-1}{x+3} \leq 3$.

Problem 3: Solve the equation $x + \sqrt{x} = 2$.

Problem 4: Solve the equation $5^{2x+4} = 25^{6x+1}$.

Problem 5: Solve the equation $\log_3(\log_2(x) - 5) = 3$.

Problem 6: Sketch the parabola $y = x^2 - 2x + 3$, and find the coordinates of its vertex.

Problem 7: Sketch the graph of a function $y = \log_{10}(x + 1) - 2$, and find its intersections with the axes.

Problem 8: Find the inverse of a function $y = 3^{-x}$ and determine its domain.

Problem 9: Simplify $\left(\dfrac{1}{\sqrt{x}+1} - \dfrac{\sqrt{x}}{x-1} \right) : \left(\sqrt{1-x} + \dfrac{1}{\sqrt{1-x}} \right)$.

Problem 10: For $a > 0$, simplify $\left(\sqrt[3]{\dfrac{a \cdot a^2}{a^{\frac{1}{2}}}} \right)^2$