Problem 1. (10pts) Simplify
\[
\frac{(zx^2)^{-3}}{(\sqrt{z^6y^{-3}})^\frac{1}{3}}.
\]

Problem 2. (15pts) Find the domain of function
\[
f(x) = \frac{1}{\sqrt{x^2 - 3x}} + \sqrt{x - 2}.
\]
Problem 3. (15pts) Find an equation of the line through point (1, -2) and perpendicular to the line $3x - 2y = 2$.

Problem 4. (20pts) Find maximum or minimum of the following function

$$\ f(x) = -2x^2 + 4x + 6.$$  

Also find $x$-intercepts and $y$-intercepts and sketch the graph of this function.
Problem 5. (15pts) Solve
\[(x - 6)(x^8 - 2x^4 - 3) = 0.\]

Problem 6. (20pts) Simplify
\[\frac{1}{x^2 - 1} - \frac{1 - x}{x^2 - 2x - 3} - \frac{x + 1}{x - 3}.\]
Problem 7. (15pts) Give a definition of decreasing function. Show that \( f(x) = x^2 - 2x - 3 \) is not decreasing function on the interval \([-2, 3]\). Find the average rate of change of this function on the interval \([-1, 1]\).