Name: _____

MATH 101
Summer 2022
HW 9: Due 06/09

"Science is organized knowledge. Wisdom is organized life."
–Immanuel Kant

Problem 1. (10pt) Find the domain of the rational function below. What are the vertical asymptotes of the given rational function? Also, simplify the rational function.

$$\frac{x^2 - 36}{x^2 - 2x - 24}$$

Problem 2. (10pt) Simplifying as much as possible, compute the following:

$$\frac{3x+1}{x^2-1} - \frac{x+5}{x+1}$$

Problem 3. (10pt) Simplifying as much as possible, compute the following:

$$\frac{7-x}{x^2+8x+12}+\frac{x}{x^2+x-30}$$

Problem 4. (10pt) Simplifying as much as possible, compute the following:

$$\frac{x^2-4}{x^3-9x} \cdot \frac{x^2-2x-3}{x^2-3x-10}$$

Problem 5. (10pt) Simplifying as much as possible, compute the following:

$$\frac{\frac{2x^2+8x}{x^2-6x-7}}{\frac{x^2+9x+20}{x^2-4x-5}}$$

Problem 6. (10pt) Simplifying as much as possible, compute the following:

$$\frac{\dfrac{x^2+2x-3}{x^2+11x+10}}{\dfrac{x^2+8x-9}{x^2+8x-20}}$$

Problem 7. (10pt) Fully justifying your answer, determine if the point $(-1, 3)$ is a solution to the following system of equations:

$$\begin{cases} 4x - 7y = -8 \\ -3x + 5y = 5 \end{cases}$$

Problem 8. (10pt) Show that the following system of equations has a solution:

$$6x - 3y = 11$$

$$2x + 5y = 12$$

Problem 9. (10pt) Solve the following system of equations and verify that your solution is valid:

$$\begin{cases} 6x + 4y = 0 \\ -12x + 6y = -7 \end{cases}$$

Problem 10. (10pt) Solve the following system of equations and explain whether your solution is the only one possible:

$$\frac{1}{2}x + 4y = -1$$

$$\frac{1}{3}x - 5y = 7$$