Name: _____

MATH 101
Summer 2022
HW 12: Due 06/16

"Progress is made by trial and failure; the failures are generally a hundred times more numerous than the successes; yet they are usually left unchronicled."

–William Ramsay

Problem 1. (10pt) Showing all your work, solve the following equation:

$$4 - 3\log_2(5x) = 1$$

Problem 2. (10pt) Showing all your work, solve the following equation:

$$4\log_3(1-x)+5=100$$

Problem 3. (10pt) Showing all your work, solve the following equation:

$$2\ln(x^2) - 4 = 14$$

Problem 4. (10pt) Showing all your work, solve the following equation:

$$6 - 5(4^{2x+1}) = 1$$

Problem 5. (10pt) Showing all your work, solve the following equation:

$$3e^{2x-1} - 4 = 11$$

Problem 6. (10pt) Find the number of digits in each of the following numbers:

(a) 2^{100}

(b) 15^{12}

(c) 2022^{2023}

Problem 7. (10pt) Find the number of digits in each of the following numbers if they were expressed in base-16:

(a) 2^{100}

(b) 15^{12}

(c) 2022^{2023}

Problem 8. (10pt) Stefan takes out a small business loan for $24,000. The interest deal he got on the loan was 2.8% annual interest, compounded continuously. How long until he owes $60,000?

Problem 9. (10pt) Gloria invests $6,000 in a startup that promises a 7.2% annual return, compounded semiannually, in the form of interest on the investment. Assuming that the company can hold true to these promises, how long will it take for the investment to have earned $500 in interest?

Problem 10. (10pt) Tatsuki purchases $800 worth of savings bond which earn 9.62% annual interest, compounded monthly. How long until Tatsuki's bonds have doubled in value?