2023 MATH FIELD DAY NAME_____
SCHOOL_____

Exponential and Logarithmic Functions (11th GRADE)

Place all answers in the blank space provided. All answers should be in exact, simplified form unless otherwise stated.

In 1-6 find the exact value of the logarithmic expression without using a calculator.

_____1. Evaluate exactly. $log_5\left(\frac{1}{\sqrt[b]{5}}\right)$

_____ 2. Evaluate exactly. $\ln(2e) + \ln(e^{-5})$

_____3. Evaluate exactly. $\log(10^e) + \ln(e^{-5}) - log_2(2^3)$

_____4. Evaluate exactly. $log_a\left(\frac{\sqrt[5]{a}}{a^5\sqrt{a}}\right)$

_____5. Evaluate exactly. $-10^{\log(3/d)}$

_____6. Evaluate exactly. $e^{\ln(b)+\ln(e)}$

_____7. Use the properties of logarithms to write the expression $\log\left(\frac{c^2}{c^2-1}\right)$ as a sum, difference, and/ or multiple of logarithms.

_____8. Write the expression as a single logarithm. $-\ln(t^2) + \frac{1}{3}\ln(s+3) - \ln(3-x)$

_____9. How long does it take for an investment to double in value if it earns 6% per year compounded continuously? Round your answer to the nearest whole number.

_____10. Given $log_b(4) = 1.345$ and $log_b(3) = 1.972$, evaluate $log_b(48)$ to three decimal places.

_____11. Evaluate $log_{19}\left(\frac{1}{5}\right)$ to three decimal places.

For problems 12-19 solve each equation. Give exact answers.

_____12. $\ln(4-x) = \ln(2)$

_____13. $log_3(4x+1) = 2$

_____14. $8log_3(x-3) = 2$

_____15. $log_7(x) - 2 = -log_7(x)$

_____16. $log_9(6x) = 2log_9(3) + log_9(x^2-7)$

_____ _____17. $2^{3x} = 4^{2x+1}$

_____18. $e^{\ln(3)-\ln(x)} = 5$

_____19. $3(2^{x+2}) + 1 = 25$

_____20. Find the domain of the function $f(x) = \frac{5}{4}\log(1-10x) + 335$