Name _____ Date _____ Period _____

DIRECTIONS: For #1-2, rewrite the logarithmic expressions in **exponential form**. Write your answers in the provided blanks.

1. $\log_9 729 = 3$

2. $\ln 24 = 3.18$

_____

_____

DIRECTIONS: For #3-4, rewrite the exponential expressions in **logarithmic form**. Write your answers in the provided blanks.

3. $e^7 = 1096.63$

4. $2^6 = 64$

_____

_____

DIRECTIONS: For #5-9, **simplify** the expressions. Write your answers in the provided blanks.

5. $\log_6 36$

6. $\log_{27} \frac{1}{3}$

_____

_____

7. $2 \log 5 + \log 4$

8. $\log_3 4 - \log_3 36$

_____

_____

9. $\ln e^8$

_____

DIRECTIONS: For #10, **expand** the logarithmic expression. Write your answers in the provided blanks.

10. $\log_6 \frac{10x}{y^3}$

_____

DIRECTIONS: For #11-12, **condense** the logarithmic expressions **into one term**. Write your answers in the provided blanks.

11. $\ln 80 - \ln 20$ **12.** $3 \log_4 x + \log_4 6$

_____   _____

DIRECTIONS: For #13-17, **solve** the equations for the variable x. Write your answers in the provided blanks.

13. $\log_2 x = 8$ **14.** $\log_x 16 = \frac{4}{3}$

_____   _____

15. $\log_x 4 = 1$

_____

16. $\log_a x = 3 \log_a 2 + \log_a 6$

_____

17. $\log_b(x + 2) - \log_b x = \log_b 6$

_____

DIRECTIONS: For #18-20, use the **change of base** formula (and a calculator) to evaluate the expressions to the nearest thousandth (3 decimal places). Write your answers in the provided blanks.

18. $\log_3 15$ **19.** $\log_5 2$ **20.** $\log_{\frac{1}{3}} 27$

_____   _____   _____

DIRECTIONS: For #21-24, **solve for x**. Give answers to the nearest thousandth (3 decimal places)

21. $12^x = 360$ **22.** $4 \log_3 x + 3 = 5$

_____   _____

23. $\log x = 2.3491$ **24.** $\log x = 31.9004$

_____   _____

The following formulas may help you answer #25-28.

$$A = p(1 + r)^t \qquad A = p(1 - r)^t \qquad A = p(1 + \frac{r}{n})^{nt}$$

DIRECTIONS: For #25-28, use the given information to **answer the questions**. Show work and round answers to the nearest hundredth (or nearest cent). Write your answers in the provided blanks.

25. A house appreciates at a rate of 2.4% per year. How much will the house be worth in 15 years if it was purchased for $81,000?

_____

26. A car that was purchased for $24,000 depreciated to a value of $8,000 after 6 years. What was the annual rate of depreciation?

_____

$$A = p(1 + r)^t \qquad\qquad A = p(1 - r)^t \qquad\qquad A = p(1 + \frac{r}{n})^{nt}$$

27. If you invest $5,000 in a fund that earns 8% interest compounded quarterly, how much will you have after 10 years?

_____

28. How long (in years) will it take for an amount deposited at 3.9% interest compounded monthly to double in value?

_____