

Name _____ Date _____ Period _____

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

1. $\log_9 729 = 3$

$$9^3 = 729$$

2. $\ln 24 = 3.18$

$$e^{3.18} = 24$$

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

3. $e^7 = 1096.63$

$$\ln 1096.63 = 7$$

4. $2^6 = 64$

$$\log_2 64 = 6$$

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

5. $\log_6 36$

$$2$$

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

$$-\frac{1}{3}$$

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

$$2$$

8. $\log_3 4 - \log_3 36$

$$-2$$

9. $\ln e^8$

$$8$$

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

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

$\log_6 10 + \log_6 x + 3 \log_6 y$

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

11. $\ln 80 - \ln 20$

12. $3 \log_4 x + \log_4 6$

$\ln 4$

$\log_4 6x^3$

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

13. $\log_2 x = 8$

14. $\log_x 16 = \frac{4}{3}$

256

8

15. $\log_x 4 = 1$

4

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

$$x = 48$$

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

$$x = \frac{2}{5}$$

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.

$$18. \log_3 15$$

$$2.465$$

$$19. \log_5 2$$

$$0.431$$

$$20. \log_{\frac{1}{3}} 27$$

$$-3$$

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

$$21. 12^x = 360$$

$$2.369$$

$$22. 4 \log_3 x + 3 = 5$$

$$1.732$$

$$23. \log x = 2.3491$$

$$223.409$$

$$24. \log x = 31.9004$$

$$7.951 \times 10^{31}$$

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

$$A = p(1 + r)^t$$

$$A = p(1 - r)^t$$

$$A = p\left(1 + \frac{r}{n}\right)^{nt}$$

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?

\$115,607.06

- 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?

16.73%

$$A = p(1 + r)^t$$

$$A = p(1 - r)^t$$

$$A = p\left(1 + \frac{r}{n}\right)^{nt}$$

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

\$11,040.20

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

17.80 years