

Name: \_\_\_\_\_

Per: \_\_\_\_\_

Date: \_\_\_\_\_

**Use the properties of logarithms to rewrite the expression in terms of log 2 and log 7.**

Then use  $\log 2 \approx 0.301$  and  $\log 7 \approx 0.845$  to approximate the expression.

1.  $\log 4$

2.  $\log 14$

3.  $\log\left(\frac{7}{2}\right)$

4.  $\log\left(\frac{2}{7}\right)$

5.  $\log 7^{-3}$

6.  $\log 49$

**Expand** the following expressions:

7.  $\log_2(3x)$

8.  $\log_3(9x)$

9.  $\log_2(x^3\sqrt{x-1})$

10.  $\log_3 3x^{\frac{2}{3}}y^5$

11.  $\log_3 x^5$

12.  $\log_4 2y^2\sqrt{x}$

13.  $\log x^{\frac{1}{2}}y^4$

14.  $\log\left(\frac{6}{x}\right)$

15.  $\log\left(\frac{x}{5}\right)$

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$$16. \log \frac{x^2}{yz^3}$$

$$17. \log x^{-3}$$

$$18. \log_2(x\sqrt{x+1})$$

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**Convert Log to Exponential:**

$$19. \log_3(x-2) = 4$$

$$20. \log_x \frac{1}{81} = -4$$

$$21. \log a = z$$

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**Convert Exponential to Log**

$$22. x^{-3} = \frac{1}{64}$$

$$23. 9^x = w$$

$$24. b^k = k$$

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Solve:

$$25. 3^{x-2} = 81$$

$$26. 5^{x+18} = 625^{2x}$$

$$27. \log_4(x+3) = 3$$

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