

**No Calculators!!**

Rewrite in exponential or logarithmic form.

- |                   |                   |                   |                    |                    |
|-------------------|-------------------|-------------------|--------------------|--------------------|
| 1. $\log_3 7 = x$ | 2. $\log_x 4 = 5$ | 3. $\log_9 x = 3$ | 4. $2\log 3 = x$   | 5. $3\log_4 2 = x$ |
| 6. $3^x = 4$      | 7. $x^4 = 9$      | 8. $8^{-2} = x$   | 9. $2^{(x+2)} = 5$ | 10. $6^{-3} = x$   |

Expand.

- |                         |  |   |  |
|-------------------------|--|---|--|
| 11. $\log_2(x^3 y z^4)$ | 12. $\log\left(\frac{a^2 b^5}{c^4}\right)$ | 13. $\log\left(\frac{f^{-2} g^4}{\frac{1}{h^3 k}}\right)^2$ | 14. $\log_m\left(\frac{3w^2 b^{-2}}{4}\right)$ |
|-------------------------|--|---|--|

Write as a single logarithm.

- |                                |  |  |
|--------------------------------|--|--|
| 15. $\log m + \log n - \log p$ | 16. $2\log_3 x + 3\log_3 y - 4\log_3 z$                | 17. $\log x + \log(x-2)$                   |
| 18. $3\log_2 x - 4\log_2(x^2)$ | 19. $\frac{1}{2}\log 25 - \frac{1}{3}\log 64 + \log 2$ | 20. $3\log_5 x + 2\log_5 x - 4\log_5(x+1)$ |

Solve for  $x$ .

- |                                  |                               |  |                             |                             |                      |
|----------------------------------|-------------------------------|--|-----------------------------|-----------------------------|----------------------|
| 21. $\log x = 3$                 | 22. $\log_3(x+1) = 2$         | 23. $\log_4 64 = x$                          | 24. $3^{2x} = \frac{1}{27}$ | 25. $x^{\frac{3}{2}} = 125$ | 26. $4\log_3 x = 20$ |
| 27. $\log_3 x - \log_3(x-1) = 2$ | 28. $\log_2 x + \log_2 3 = 5$ | 29. $2\log_4 5 + \log_4 x - \log_4(x+1) = 2$ |                             |                             |                      |

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