

HW54

1. $3^x = 7$

2. $x^5 = 4$

3. $9^3 = x$

4. $\log 9 = x$

$10^x = 9$

5. $\log_4 8 = x$

$4^x = 8$

6. $\log_3 4 = x$

7. $\log_x 9 = 4$

8. $\log_8 x = -2$

9. $\log_2 5 = x + 2$

10. $\log_6 x = -3$

11. $\log_2 x^3 + \log_2 y + \log_2 z^4$

$= 3 \log_2 x + \log_2 y + 4 \log_2 z$

12. $\log a^2 + \log b^5 - \log c^4$

$= 2 \log a + 5 \log b - 4 \log c$

13. $2 (\log f^{-2} + \log g^4 - \log h^{1/3} - \log k)$

$= 2 (-2 \log f + 4 \log g - 1/3 \log h - \log k)$

$= -4 \log f + 8 \log g - 2/3 \log h - 2 \log k$

14. $\log_m 3 + \log_m w^2 + \log_m b^{-2} - \log_m 4$

$= \log_m 3 + 2 \log_m w - 2 \log_m b - \log_m 4$

15. ~~$\log(mn)$~~ $\log\left(\frac{mn}{p}\right)$

16. $\log_3 x^2 + \log_3 y^3 - \log_3 z^4$

$= \log_3\left(\frac{x^2 y^3}{z^4}\right)$

17. $\log(x(x-2))$

18. $\log_2 x^3 - \log_2 (x^2)^4$

$= \log_2\left(\frac{x^3}{x^8}\right)$ or $\log_2\left(\frac{1}{x^5}\right)$

19. $\log 25^{1/2} - \log 64^{1/3} + \log 2$

$= \log 5 - \log 4 + \log 2$

$= \log\left(\frac{5}{4} \cdot 2\right)$

$= \log\left(\frac{10}{4}\right)$

$= \log(5/2)$

26. $\log_3 x^4 = 20$

$(3^{20})^{1/4} = (x^4)^{1/4}$

$3^5 = x$

$\boxed{243 = x}$

27. $\log_3\left(\frac{x}{x-1}\right) = 2$

$3^2 = \frac{x}{x-1}$

$9(x-1) = x$

$9x - 9 = x$

$8x = 9$

$\boxed{x = 9/8}$

28. $\log_2(3x) = 5$

$2^5 = 3x$

$32 = 3x$

$\boxed{32/3 = x}$

20. $\log_5 x^3 + \log_5 x^2 - \log_5 (x+1)^4$

$= \log_5\left(\frac{x^3 x^2}{(x+1)^4}\right) = \log_5\left(\frac{x^5}{(x+1)^4}\right)$

21. $10^3 = x$

$\boxed{1000 = x}$

22. $3^2 = x + 1$

$9 = x + 1$

$\boxed{8 = x}$

23. $4^x = 64$

$4^x = 4^3$

$\boxed{x = 3}$

24. $3^{2x} = 3^{-3}$

$2x = -3$

$\boxed{x = -3/2}$

25. $x^{3/2} = 125$

$x = (\sqrt[3]{125})^2$

$\boxed{x = 25}$