

REVIEW #2

Simplify each logarithm.

1. $\log_5 36$
2
2. $\log_2 128$
7
3. $\log_3 \frac{1}{9}$
-2
4. $\log_5 1$
0
5. $\log_{\frac{1}{2}} 4$
 $x = -2$
6. $\log_8 4$
 $8^x = 4$
 $x = \frac{2}{3}$
7. $\log_{10} 0.001$
-3
8. $\log_{\sqrt{3}} \frac{1}{27}$ $3^{\frac{1}{2}x} = 3^{-3}$
-6

9. $\log_8 x = 3$
 $8^3 = x$
10. $\log_x \frac{1}{64} = -3$
 $x^{-3} = \frac{1}{64}$ $x = 4$
11. $\log_{\sqrt{3}} 9 = x$
 $3^{\frac{1}{2}x} = 3^2$ $x = 4$
12. $\log_{\frac{1}{8}} x = -\frac{4}{3}$ $x = 16$
 $\frac{1}{8}^{-\frac{4}{3}} = x$ $2^{-1(-\frac{4}{3})} = x$
13. $\log_x \frac{1}{16} = -8$ $(x^{\frac{1}{4}})^{-4} = 2^{-4}$
 $x^{-8} = 2^{-4}$ $x = \sqrt{2}$
14. $\log_{\frac{1}{10}} 10,000 = x$
 $10^{-x} = 10^4$
 $x = -4$

Express each logarithm in terms of $\log_3 M$ and $\log_3 N$.

15. $\log_3 MN^2$
 $\log_3 M + 2\log_3 N$
16. $\log_3 \sqrt{MN}$
 $\frac{1}{2}\log_3 M + \frac{1}{2}\log_3 N$
17. $\log_3 \frac{M^2}{N}$
 $2\log_3 M - \log_3 N$
18. $\log_3 \sqrt{\frac{M}{N^2}}$
 $\frac{1}{2}\log_3 M - \log_3 N$

Express as a single logarithm.

19. $\log_5 d - \log_5 f + \log_5 k - \log_5 n$
 $\log_5 \frac{dk}{fn}$
20. $3 - \log_3 r$
 $3\log_3 3 - \log_3 r$ $\log_3 27r$
21. $2\log_2 m + \frac{1}{2}\log_2 n$
 $\log_2 m^2 \sqrt{n}$
22. $\log \frac{a}{b^2} - 2\log \frac{c}{a}$
 $\log \frac{\frac{a}{b^2}}{\frac{c^2}{a^2}} = \log \frac{a^3}{b^2 c^2}$

Solve for x.

23. $\log_7 x = \log_7 4 + \log_7 3 - \log_7 2$
 $x = 6$ $\log_7 x = \log_7 \frac{4 \cdot 3}{2}$
24. $\log_3 x = 4\log_3 2 + \log_3 5 - \log_3 4$
 $\log_3 x = \log_3 \frac{16 \cdot 5}{4}$
 $x = 20$
25. $\log_5 x = \frac{1}{2}\log_5 9 + \log_5 (x-1)$
 $\log_5 x = \log_5 3(x-1)$
 $x = \frac{3}{2}$
26. $\log_2 (x-4) - \log_2 3 = \log_2 2$
 $\frac{x-4}{3} = 2$
 $x = 10$
27. $\log_7 3x^2 = 2\log_7 2 + \log_7 3$
 $\log_7 3x^2 = \log_7 \frac{2^2 \cdot 3}{1}$
 $\frac{3x^2}{3} = \frac{8 \cdot 3}{3}$
 $x^2 = 64$
 $x = +8$ $x = -8$
28. $2\log_2 (x+1) - \log_2 4 = 0$
 $\log_2 \frac{(x+1)^2}{4} = 0$
 $0 = x^2 + 2x - 3$
 $0 = (x+3)(x-1)$
 $x = -3$ $x = 1$