**Logarithm Practice Worksheet**

1. Special Cases

（1）$log\_{a}1$ = \_\_\_\_\_\_\_ （2）$log\_{a}a$ = \_\_\_\_\_\_\_

（3）$log\_{10}N$ is shorten as \_\_\_\_\_\_\_ （4）$log\_{e}N$ is shorten as \_\_\_\_\_\_ (where e = 2.71828…)

2. Basic formulas （where a>0, a≠1, M>0, N>0）

（1）$log\_{a}(MN)$ = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

（2）$log\_{a}\frac{M}{N}$ = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

（3）$log\_{a}M^{n}$ = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ , $log\_{a}\sqrt[n]{M}$

（4）$a^{log\_{a}N}$ = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

（5）$log\_{a}b$ = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (change base formula)

（6）$log\_{a}b∙log\_{b}c∙log\_{c}d$ = \_\_\_\_\_\_\_

3. 3x = 4y = 36, find the value of $\frac{2}{x}+\frac{1}{y}$

4. log5×log20 + (log2)2 = \_\_\_\_\_\_\_\_\_\_

5. 2log5 + $\frac{2}{3}$ log8 + log5log20 + (log2)2 = \_\_\_\_\_\_\_\_\_\_\_\_\_

6. $5^{1-log\_{0.2}3}$ = \_\_\_\_\_\_\_\_

7. $log\_{3}7∙log\_{2}9∙log\_{49}32$ = \_\_\_\_\_\_\_\_\_\_\_\_

8. $log\_{18}9$ = a, 18b = 5, find the value of $log\_{36}45$

9. x>1, y>1, z>1, a≠0, $log\_{z}a$ = 24, $log\_{y}a$ = 40, $log\_{xyz}a$ = 12, find the value of $log\_{x}a$

10. $(\frac{1}{2})^{-1+log\_{0.5}4}$ = \_\_\_\_\_\_\_\_\_\_\_\_

\*11. compare the two values

（1）ln3.4 ln8.5 （2）$log\_{0.7}1.6$ $log\_{0.7}1.8$

（3）$log\_{0.3}4$ $log\_{0.2}0.7$ （4）$log\_{2}3$ $log\_{3}2$

（5）$log\_{2}0.4$ $log\_{3}0.4$

12. $2log\_{3}2-log\_{3}\frac{32}{9}+log\_{3}8-5^{log\_{5}3}$ = \_\_\_\_\_\_\_\_\_\_\_\_\_\_

13. $log\_{\sqrt{2}-1}(3+2\sqrt{2})$ = \_\_\_\_\_\_\_\_\_\_\_\_

14. $log\_{3}4∙log\_{4}8∙log\_{8}m= log\_{4}16$ , find the value of m

\*15. $log\_{a}(3a-1)$ > 0, what’s the range of a