1. What is the inverse of the function $y = \log_3 x$?

   (1) $y = 3^x$ (2) $x = 3^y$ (3) $y = \log_x 3$ (4) $y = x^3$

2. The equation $\log_a x = y$ where $x > 0$ and $a > 1$ is equivalent to

   (1) $a^x = y$ (2) $x^y = a$ (3) $a^y = x$ (4) $y^a = x$

3. The function $y = 2^x$ is equivalent to

   (1) $x = y \log 2$ (2) $x = \log_2 y$ (3) $y = \log_2 x$ (4) $y = x \log 2$

4. Which is the equivalent exponential form of $\log_b N = x$?

   (1) $x^b = N$ (2) $b^x = N$ (3) $b^N = x$ (4) $N^b = x$

5. If $\log_b x = y$, then x equals

   (1) y^b (2) $\frac{y}{b}$ (3) $y \bullet b$ (4) b^y

6. Which logarithmic equation is equivalent to $L^m = E$?

   (1) $\log_E m = L$ (2) $\log_m E = L$
   (3) $\log_L E = m$ (4) $\log_E L = m$

7. Which equation is equivalent to $y = 3^x$?

   (1) $\log_3 x = y$ (2) $\log 3 = x$ (3) $\log_3 y = x$ (4) $\log_y x = 3$

8. The equation $y = a^x$ expressed in logarithmic form is

   (1) $x = \log_a y$ (2) $x = \log_y a$ (3) $y = \log_a x$ (4) $a = \log_x y$

9. If $\log_b n = y$, then n equals

   (1) b^y (2) y^b (3) $y \cdot b$ (4) $\frac{y}{b}$

10. Solve for x in terms of a and b:
$\log_b x = a$

11. If $\log a = x$ and $\log b = y$, then $\log(ab^2)$ equals
(1) $x + \frac{1}{2}y$ (2) $2x + 2y$ (3) $x + 2y$ (4) $\frac{1}{2}(x + y)$

12. Write $\sqrt[3]{x} \times \sqrt{x}$ as a single term with a rational exponent.

13. Express $\frac{12x^{-5}y^5}{24x^{-3}y^{-2}}$ in simplest form, using only positive exponents.

14. Determine the exact value of $(\frac{27}{64})^{-\frac{2}{3}}$ as a fraction in simplest form.

15. The expression $9^{\frac{3}{2}} \cdot 27^{\frac{1}{2}}$ is equivalent to
(1) $243^{\frac{3}{4}}$ (2) 243^2 (3) $3^{\frac{9}{2}}$ (4) 3^2

16. Explain how $\left(3^{\frac{1}{5}}\right)^2$ can be written as the equivalent radical expression $\sqrt[5]{9}$.

17. The expression $\left(x^{\frac{1}{2}}y^{-\frac{2}{3}}\right)^{-6}$ is equivalent to
(1) $\frac{1}{x^3y^4}$ (2) x^3y^4 (3) $\frac{x^3}{y^4}$ (4) $\frac{y^4}{x^3}$

18. When $b > 0$ and d is a positive integer, the expression $(3b)^{\frac{2}{d}}$ is equivalent to

(1) $\left(\sqrt[d]{3b}\right)^2$

(2) $\frac{1}{\sqrt{3b^d}}$

(3) $\left(\sqrt{3b}\right)^d$

(4) $\frac{1}{\left(\sqrt[d]{3b}\right)^2}$