

Supplemental WS 10

$$\textcircled{1} \quad \log_5 x = 2$$

$$x = 5^2$$

$$x = 25$$

$$\textcircled{2} \quad \log_x 25 = 2$$

$$x^2 = 25$$

$$x = 5$$

$$\textcircled{3} \quad \log_x 16 = -\frac{4}{3}$$

$$x^{-4/3} = 16$$

$$x^{4/3} = \frac{1}{16}$$

$$x^{4/3} = \frac{1}{2^4}$$

$$\sqrt[4]{x^{4/3}} = \sqrt[4]{\frac{1}{2^4}}$$

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

$$^3(x^{1/3}) = \left(\frac{1}{2}\right)^3$$

$$x = \frac{1}{8}$$

$$\textcircled{4} \quad \log_{\frac{1}{2}} \left(\frac{1}{2}\right)^4 = x$$

$$\left(\frac{1}{2}\right)^x = \left(\frac{1}{2}\right)^4$$

$$x = 4$$

$$\textcircled{5} \quad \log_x x^4 = 4$$

$$x^4 = x^4$$

$$x > 0 \text{ and } x \in \mathbb{R}$$

$$\textcircled{6} \quad \log_7 1 = x$$

$$7^x = 1$$

$$x = 0$$

$$\textcircled{7} \quad \log_x 16 = \frac{4}{3}$$

$$x^{4/3} = 16$$

$$x^{4/3} = 2^4$$

$$x^{1/3} = 2$$

$$x = 2^3$$

$$x = 8$$

$$\textcircled{8} \quad \log_2 x = 2$$

$$x = 2^2$$

$$x = 4$$

$$\textcircled{9} \quad \log_{16} 2 = x$$

$$16^x = 2$$

$$(2^4)^x = 2$$

$$2^{4x} = 2^1$$

$$4x = 1$$

$$x = \frac{1}{4}$$

$$\textcircled{10} \quad \log_{32} x = \frac{2}{5}$$

$$32^{\frac{2}{5}} = x$$

$$(2^5)^{\frac{2}{5}} = x$$

$$2^2 = x$$

$$x = 4$$

$$\textcircled{11} \quad \log_5 25^5 = x$$

$$5^x = 25^5$$

$$= (5^2)^5$$

$$5^x = 5^{10}$$

$$x = 10$$

$$\textcircled{12} \quad 27^{\log_3 9} = x$$

$$(\log_3 9 = 2)$$

$$27^2 = x$$

$$x = 729$$

$$\textcircled{13} \quad \log_6 (\log_2 64) = x$$

$$(\log_2 64 = 6)$$

$$\log_6 6 = x$$

$$6^x = 6$$

$$x = 1$$

$$\textcircled{14} \quad \log_x \sqrt{5} = \frac{1}{4}$$

$$x^{1/4} = 5^{1/2}$$

$$(x^{1/4})^4 = (5^{1/2})^4$$

$$x = 5^2$$

$$x = 25$$

$$\textcircled{15} \quad \log_5 (x^2 - 4x) = 1$$

$$x^2 - 4x = 5^1$$

$$x^2 - 4x - 5 = 0$$

$$(x - 5)(x + 1) = 0$$

$$x = 5 \quad \text{or} \quad x = -1$$

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