

I. State the translation(s), asymptote, domain, and range of each function using interval notation.

Given Exp/Log Function	Translation(s)	Asymptote	Domain	Range
1.) $f(x) = 3^x - 2$ Exp	down 2	HA: $y = -2$	$(-\infty, \infty)$	$(-2, \infty)$
2.) $f(x) = \log_4(x - 3)$ Log	right + 3	VA: $x = 3$	$(3, \infty)$	$(-\infty, \infty)$
3.) $f(x) = (\frac{1}{2})^{x+4}$ Exp	left + 4	HA: $y = 0$	$(-\infty, \infty)$	$(0, \infty)$
4.) $f(x) = \log(x) + 5$ Log	up 5	VA: $x = 0$	$(0, \infty)$	$(-\infty, \infty)$
5.) $f(x) = e^{x-3} + 1$ Exp	right + 3 up 1	HA: $y = 1$	$(-\infty, \infty)$	$(1, \infty)$
6.) $f(x) = \log_2(x + 2) - 4$ Log	left + 2 down 4	VA: $x = -2$	$(-2, \infty)$	$(-\infty, \infty)$
7.) $f(x) = \ln(x - 5) + 3$ Log	right + 5 up 3	VA: $x = 5$	$(5, \infty)$	$(-\infty, \infty)$
8.) $f(x) = 4^{x+1} - 3$ Exp	left + 1 down 3	HA: $y = -3$	$(-\infty, \infty)$	$(-3, \infty)$

II. Evaluate each expression or find the value of x. MUST SHOW WORK for credit!!

9.) $\log_2 x = 5$ $2^5 = x$ $x = 32$	10.) $\log_4 16 = x$ $4^x = 16$ $4^x = 4^2$ $x = 2$	11.) $\log_x 81 = 4$ $x^4 = 81$ $\sqrt[4]{x^4} = \sqrt[4]{81}$ $x = 3$	12.) $\log_5 \left(\frac{1}{125}\right) = x$ $5^x = \frac{1}{125}$ $5^x = 5^{-3}$ $x = -3$
13.) $\log_8 \left(\frac{1}{4}\right) = x$ $8^x = \frac{1}{4}$ $(2^3)^x = 2^{-2}$ $\frac{3x}{3} = \frac{-2}{3}$ $x = -\frac{2}{3}$	14.) $4^{2\log_4 6}$ $4^{\log_4 6^2}$ $4^{\log_4 36}$ $= 36$	15.) $e^{\frac{1}{2}\ln 9}$ $e^{\ln 9^{\frac{1}{2}}}$ $= \sqrt{9} = 3$	16.) $\log_3 \sqrt{27} = x$ $3^x = \sqrt{27}$ $3^x = (3^3)^{\frac{1}{2}}$ $x = \frac{3}{2}$
17.) $\log 2 + \log 5$ $\log(2 \cdot 5)$ $\log 10 = x$ $10^x = 10$ $x = 1$	18.) $\log_2 \sqrt{\frac{1}{8}} = x$ $2^x = (2^{-3})^{\frac{1}{2}}$ $x = -\frac{3}{2}$	19.) $\log_x 6 = \frac{1}{2}$ $x^{\frac{1}{2}} = 6$ $(\sqrt{x})^2 = 6^2$ $x = 36$	20.) $\ln \left(\frac{1}{\sqrt[3]{e}}\right)$ $\ln(e^{-\frac{1}{3}})$ $= -\frac{1}{3}$
21.) $\log_{81} 9 = x$ $81^x = 9$ $(9^2)^x = 9^1$ $\frac{2x}{2} = \frac{1}{2}$ $x = \frac{1}{2}$	22.) $\log_4 192 - \log_4 3$ $\log_4 \left(\frac{192}{3}\right)$ $\log_4 64 = x$ $4^x = 64$ $x = 3$	23.) $\log_2 4 + 3\log_2 2$ $\log_2 4 + \log_2 8$ $\log_2 (4 \cdot 8)$ $\log_2 32 = x$ $2^x = 32$ $x = 5$	24.) $\log \sqrt[3]{100}$ $\log (10^2)^{\frac{1}{3}} = x$ $10^x = 10^{\frac{2}{3}}$ $x = \frac{2}{3}$
25.) $2\log_5 25 - \log_5 125$ $\log_5 625 - \log_5 125$ $\log_5 \left(\frac{625}{125}\right)$ $\log_5 5 = x$ $5^x = 5$ $x = 1$	26.) $e^{\ln 6 - \ln 15 + \ln 20}$ $e^{\ln \left(\frac{6}{15}\right) + \ln 20}$ $e^{\ln \left(\frac{6 \cdot 20}{15}\right)}$ $= \frac{120}{15} = 8$	27.) $\log_x 3 = \frac{1}{3}$ $x^{\frac{1}{3}} = 3$ $(\sqrt[3]{x})^3 = (3)^3$ $x = 27$	28.) $\left(\frac{1}{10}\right)^{4\log 5}$ $(10^{-1})^{4\log 5}$ $10^{-4\log 5} = \frac{1}{10^{4\log 5}}$ $= \frac{1}{625}$