

## Math 002 – Exercises On Exponential & Logarithmic Functions

- Complete the following table :

$x$	$\log x$	$x$	$\ln x$	$x$	$\log_2 x$
0		0		0	
1		1		1	
10		$e$		2	
100		$e^2$		4	
10000		$e^5$		64	
0.1		$\frac{1}{e}$		$\frac{1}{2}$	
0.01		$\frac{1}{e^3}$		$\frac{1}{16}$	
$\sqrt{10}$		$\sqrt{e}$		$\sqrt{2}$	
$\sqrt{1000}$		$\sqrt[3]{e^2}$		$\sqrt[4]{32}$	
$\frac{100}{\sqrt{1000}}$		$\frac{e}{\sqrt[3]{e^2}}$		$\frac{4}{\sqrt[4]{8}}$	

**INSTRUCTOR : A. AL-SHALLALI**

- Complete the following table :

$x$	$10^x$	$x$	$e^x$	$x$	$3^x$
0		0		0	
-1		-2		-4	
$\frac{2}{3}$		$-\frac{3}{2}$		$\frac{5}{2}$	
$\log 2$		$\ln 3$		$\log_3 5$	
$-\log 2$		$-\ln 4$		$-\log_3 5$	
$2 \log 5$		$3 \ln 2$		$3 \log_3 4$	
$-3 \log 2$		$-4 \ln 3$		$-2 \log_3 5$	
$1 + \log 2$		$2 + \ln 2$		$3 + \log_3 2$	
$2 - \log 2$		$3 - \ln 2$		$4 - \log_3 2$	
$3 + \frac{1}{2} \log 2$		$4 - 2 \ln 3$		$2 + 3 \log_3 2$	
$\log_{100} 9$		$\log_{e^3} 27$		$\log_{\sqrt{3}} 2$	

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• **Fill in the value of :**

$$\log 1 =$$

$$\ln 1 =$$

$$\log_2 1 =$$

$$\log 10 =$$

$$\ln e =$$

$$\log_3 3 =$$

$$\log 10000 =$$

$$\ln e^4 =$$

$$\log_2 32 =$$

$$\log \sqrt{10} =$$

$$\ln \sqrt[3]{e} =$$

$$\log_5 \sqrt[4]{5} =$$

$$\log \sqrt[3]{100} =$$

$$\ln \sqrt[5]{e^2} =$$

$$\log_3 \sqrt[5]{81} =$$

$$10^{\log 2} =$$

$$e^{\ln 4} =$$

$$2^{\log_2 5} =$$

$$(100)^{(2 \log 3)} =$$

$$(\sqrt{e})^{(3 \ln 9)} =$$

$$9^{(- \log_3 2)} =$$

$$(10)^{\log_2 4} =$$

$$(e)^{(- \log_{e^2} e)} =$$

$$(16)^{\log_5 \sqrt{5}} =$$

• **Write True ( T ) or False ( F ) for the following ( where all logarithmic expressions are defined ) :**

$$e^{\left(\frac{\log 9}{\log e}\right)} = 9$$

$$\frac{\log x}{\log y} = \log x - \log y$$

$$e^{(4 \ln x)} = 4x$$

$$(10)^{(2 \log 3 + 3 \log 2)} = 72$$

$$(10)^{(5 \log y)} = y^5$$

$$\log(x + y) = \log x + \log y$$

$$(e)^{(\ln 15 - \ln 5)} = 3$$

$$- \log x - \log y = \log (xy)^{-1}$$

$$\frac{2 \log x}{3 \log y} = \log_{y^3} x^2$$

$$\log 18 - \log 2 - 2 \log 3 = 0$$

$$(\log x) (\log y) = \log(xy)$$

$$\ln(1 + 2 + 3) = \ln 1 + \ln 2 + \ln 3$$

( BY : A. AL-SHALLALI )

- Write the equivalent expression and find the domain, range, asymptote, and the x,y-intercepts for each of the following functions:

Function	Equiv. Expr.	Domain	Range	Asymp.	x,y - interc.
$y = e^{(x-1)}$	$x = 1 + \ln y$	$(-\infty, \infty)$	$(0, \infty)$	$y = 0$	no ; $e^{-1}$
$y = -10^x + 2$					
$y = 4^{(x+1)} - 8$					
$y = \ln x + 5$					
$y = \log(x + 2)$					
$y = \log(-x) + 1$					
$y = \frac{1}{2} \ln(x - 2) + 3$					
$y = 3 \log_2(x + 1) - 6$					
$y = 1 - \log_{\frac{1}{3}}(3 - x)$					