

**King Fahd University of Petroleum and Minerals**  
**College of Sciences Math Prep-Year Program**  
**Math 002-Term 032**  
**TEST 1**

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Name: \_\_\_\_\_ SEC \_\_\_\_\_ ID#: \_\_\_\_\_

**QUESTION 1** Solve the following equations:

a)  $27(3^x) = 3^{-1}$

b)  $\log_4(\log_3 x) = 1$

c)  $25 = 16^{\log_4 x}$

**QUESTION 2**

a) Write the following expression as a single logarithm:  $2 \ln x + 2(\ln y - 3 \ln z) + 3$

b) The value of  $\sec\left(-\frac{7\pi}{6}\right) + 6 \cot \frac{4\pi}{3}$

c) If  $\beta$  is the complementary angle of  $\alpha = \frac{\pi}{3}$  radian, then find the value of  $\sin(150^\circ - \beta)$

**QUESTION 3.** State whether the following statements are TRUE or FALSE:

a)  $\frac{\log_b 12}{\log_b 3} = \log_b 4$  \_\_\_\_\_

b)  $\log x^2 = 2 \log x$ , for all non zero real numbers  $x$  \_\_\_\_\_

c) The amplitude of the graph of  $y = 3 \tan x$  is 3 \_\_\_\_\_

d)  $\sin^2 x = \sin x^2$

e) The phase shift of  $y = 2 \sin\left(3x - \frac{\pi}{4}\right)$  is  $\frac{\pi}{4}$  \_\_\_\_\_

f) The measure of ONE radian is 50 times the measure of ONE degree. \_\_\_\_\_

g)  $\log_{\frac{1}{a}} x = \log_a \frac{1}{x}$  \_\_\_\_\_

**QUESTION 4** Given that  $f(x) = \ln|x - 1|$

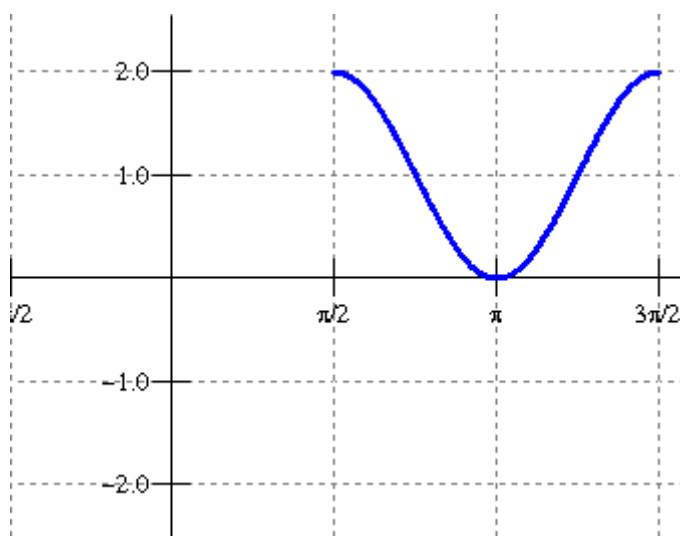
a) Find the DOMAIN

b)  $x - \text{int}$  :

c)  $y - \text{int}$  :

d) PLOT the graph:

**QUESTION 5:** The graph below represents the graph of the function  $y = a \cos(bx + c) + d$ , find the values of  $a$ ,  $b$ ,  $c$ , and  $d$



**QUESTION 6:** Given  $f(x) = \frac{3}{2} \cot\left(2x - \frac{\pi}{4}\right)$  find the:

a) Phase shift

b) Vertical Asymptotes

c)  $y$  - int :

d)  $x$  - int :