MATH 30 - Precalculus, Sec. 2497

Third test. Time allowed: two hours. Professor Luis Fernández

NAME:____

[8] **1.** Find the **exact value** of

a) $\log_{16} 4 =$

b) $\log_5 \sqrt{5} =$

c) $177^{\log_{177} 2} =$

d) $\log_{123} 123^4 =$

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[18] **2.** Find the **exact value** of

a) $\tan\left(\frac{\pi}{6}\right) =$

b) $\sin\left(\frac{2\pi}{3}\right) =$

c) $\cos\left(-\frac{\pi}{4} - 20\pi\right) =$

d) $\sin\left(\frac{7\pi}{6}\right) =$

e) $\sin\left(-\frac{7\pi}{3}\right) =$

f) $\sin^{-1}(-1) =$

g) $\tan^{-1} 1 =$

h) $\sin^{-1}\left(-\frac{\sqrt{2}}{2}\right) =$

i) $\cos^{-1}\frac{1}{2} =$

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[6] **3.** Condense the following logarithmic expressions (that is, write them using only one logarithm in the front).

a) $5\log x + 2\log y =$

b) $\frac{1}{2}\log x - 5\log y =$

c) $2\log x + \log(x^2 - 1) - \log 7 - \log(x+1) =$

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[6] **4.** Expand the following logarithmic expressions (that is, write them using addition and subtraction of many logarithms).

a) $\log_5 \frac{x^2}{13} =$

b) $\log_7 \sqrt{x^2 + 5} =$

c) $\log\left[\frac{x^4\sqrt{x^2+3}}{(x+1)^3}\right] =$

[28] **5.** Solve the following four equations. If necessary, leave the answer expressed in terms of logarithms (you do not need to use the calculator).

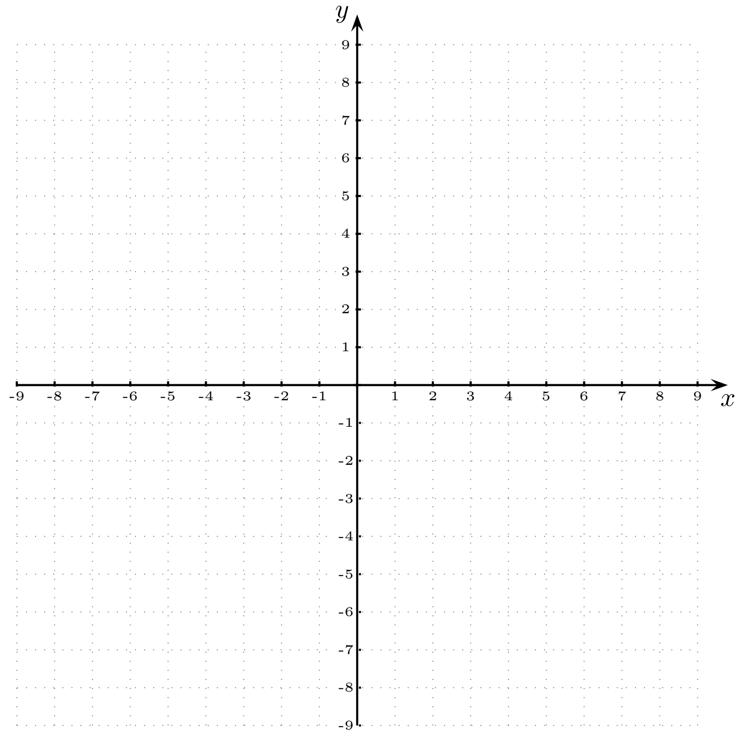
a) $11^{x-3} = 210$

b) $\log_5(x) + \log_5(x - 24) = 2$

c) $\mathrm{Ln}(5x + 1) - \mathrm{Ln}(2x + 3) = \mathrm{Ln}\, 3$

d) $2^{2x} - 6 \cdot 2^x + 8 = 0$

[12] **6.** Graph the function $f(x) = 3^x$ and the function $g(x) = \log_3 x$ in the axes provided below.



[10] **7.** Find the domain of the function $\log_3(x+4)$.

[4] **8.** Write

a) $\log_4 7$ in base 9

b) $\text{Ln}\, 5$ in base 10

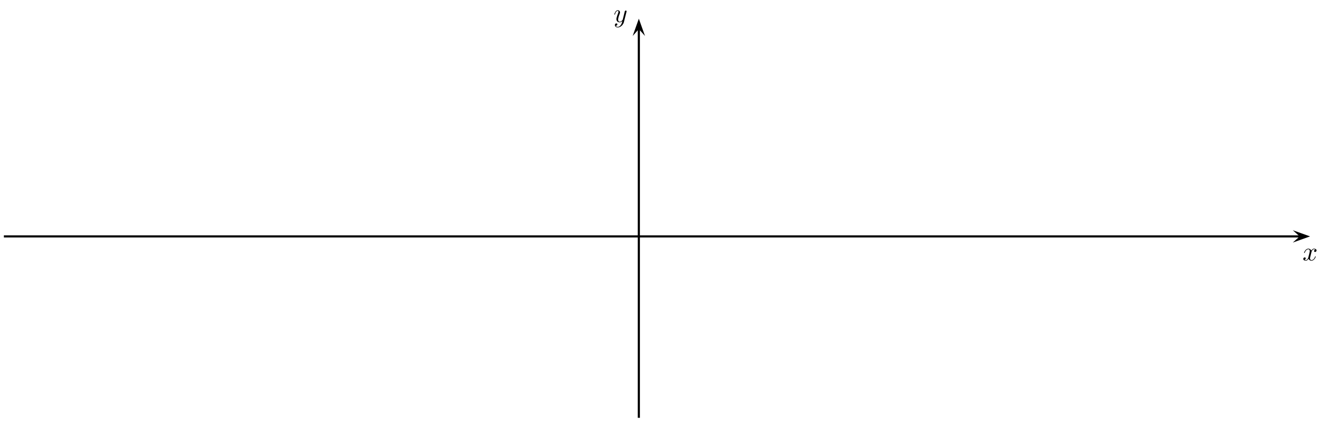
[8] **9.** Find the **exact value** of

a) $\cos\left(\tan^{-1}\frac{5}{7}\right) =$

b) $\sin\left(\cos^{-1}\frac{7}{12}\right) =$

[20] **10.** Find the amplitude, the period and the phase shift, and graph **two** cycles of the following functions in the axes provided.

a) $f(x) = \frac{1}{2} \sin\left(x - \frac{\pi}{2}\right)$



b) $g(x) = -\cos(4x - \pi)$