MATH-9 TEST 4 (Unit 4 - Inverses, Logs & Exponentials)

SAMPLE

100 points NAME:_____

Be sure to clearly show your work on test. Unless specified, exact answers are required. Calculators are allowed, but no graphing calculators.

In problems 1-5, circle T for True, F for False (2 points each)

T F (1) The range of $\cos^{-1}(x)$ is [-1,1].

T F (2) $f(x) = |x|$ is a one-to one function.

T F (3) The domain of f(x) = logx is $[0,\infty)$.

T F (4) $\ln\left(\frac{x\sqrt{y}}{z^5}\right)$ can be expanded as lnx + $\frac{1}{2}$ lny - 5 lnz.

T F (5) $\tan^{-1}(-\sqrt{3}) = -\pi/3$

In problems 6 - 10, fill in the blank with the most appropriate answer. (2 points each)

(6) $\log_3 27 + \log_7 1 + \log 100$= _____.

(7) $\sin^{-1}(1/2)$ = _____.

(8) ln 0 = _____

(9) $3^{\log_3 12}$ = _____ .

(10) If $\log_8 x = 2/3$ then x = _____ .

(11) If $\log_b \frac{1}{16} = -2$ then b = _____

(12) $\log_2 56 - \log_2 7$ = _____

(13) $\cos^{-1}\left(-\frac{\sqrt{3}}{2}\right)$ = _____

(14) $\tan^{-1}(-1)$ = _____

(15) $\sin^{-1}(\sin(2\pi/3))$ = _____.

(16) $\sin^{-1}(-1)$ = = _____

(17) $\log_{1/3} 1$ = _____

(18) Using your calculator, $\log_2 12$ = _____ (to three decimal places).

(19) $\cos^{-1}(1)$= _____

(20) $3^{\log_3 x}$ = _____

(21) Find the domain of f(x) if $f(x) = \frac{1}{\log_3(x-2)}$, and express answer using interval notation. (4 pts)

SOLVE THE FOLLOWING EXPONENTIAL AND LOGARITHMIC EQUATIONS EXACTLY, THEN GET AN APPROXIMATE ANSWER USING YOUR CALCULATOR. (7 points each)

(22) $\log x + \log(x+1) = \log 12$

(23) $4^{2X - 1} = 6.$

(24) $\log_8(x+5) - \log_8(x-2) = 1$

(25) $e^{2x} - e^{x} - 2 = 0$

(26) Find exactly (2 points each)

(a) $\sin(\cos^{-1}(-1/4))$

(b) $\cos(2 \tan^{-1}(3/4))$.

(27) (a) Find all (exact) solutions in [0, 2π) : cos ß = 2/3 (4 points)

(b) Find all (exact) solutions in [0, 2π] : sin ß = -1/4 (4 points)

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(28) Given f(x) = $\log_2(x-2)-1$, find the following. Pay close attention to details, show all steps precisely.

(a) $f^{-1}(x)$ (6 points)

(b) domain and range of f(x) and $f^{-1}(x)$. (4 points)

(c) graph f(x) and $f^{-1}(x)$ (6 points)