Advanced Math Ciphering

Haynes Mu Alpha Theta 2019

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1. Simplify $log\,(sin\,x)\ +\ log\,(csc\,x)$ for $0 < x < \frac{\pi}{2}$

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2. Find $\sin x$ if $64^{\cot x} = 256^{\cos x}$ and $0 < x < \pi$.

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3. Simplify $(\tan x + 1)^2 - 2\sin x \sec x$

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

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6. Find ALL solutions (real and complex) to the equation $x^3 + 9x - x^2 - 9 = 0$.

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7. Given that $3xy = 12$, where x and y are positive integers such that $x > y$, what is the value of $8^x / 2^y$? (simplify exponents)

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8. Find the determinant of the 3x3 matrix:

$$\begin{pmatrix} 1 & -2 & 3 \\ -5 & 8 & 4 \\ 0 & 7 & -9 \end{pmatrix}$$

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10. What is the focus of the parabola $y = 2x^2 + 3$?

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Advanced Math Ciphering Solution Key

1. 0
2. 3/4
3. sec^2 x
4. $\sqrt{3}/3$ or $1/\sqrt{3}$
5. 4
6. 1, 3i,-3i
7. 2048
8. -115
9. (0, 6] or $0 < x \leq 6$
10. (0, $3\frac{1}{8}$) (accept (0, 25/8) or (0, 3.125))