#1 Precalculus - Hustle MAO National Convention 2025

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#2 Precalculus - Hustle MAO National Convention 2025

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#3 Precalculus - Hustle MAO National Convention 2025

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#4 Precalculus - Hustle MAO National Convention 2025

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Compute:

$$\prod_{n=0}^{4} \left(\sqrt{3} - i\right)^{n}, where i = \sqrt{-1}$$

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#5 Precalculus - Hustle MAO National Convention 2025

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#6 Precalculus - Hustle MAO National Convention 2025

Find the distinct number of positive integer divisors of 288

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#7 Precalculus - Hustle MAO National Convention 2025

Compute $\sin\left(\frac{\pi}{8}\right)\sin\left(\frac{3\pi}{8}\right)\sin\left(\frac{5\pi}{8}\right)\sin\left(\frac{7\pi}{8}\right)$

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#8 Precalculus - Hustle MAO National Convention 2025

Solve for y, given x is a positive integer and $2^x 3^y 5^{(x+2)} = 202,500$.

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#9 Precalculus - Hustle MAO National Convention 2025

Evaluate
$$\lim_{x \to 4} \left(\frac{\frac{1}{x+3} - \frac{1}{x+4}}{\frac{1}{x^2 - 16}} \right)$$

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#10 Precalculus - Hustle MAO National Convention 2025

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#11 Precalculus - Hustle MAO National Convention 2025

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#12 Precalculus - Hustle MAO National Convention 2025

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#14 Precalculus - Hustle MAO National Convention 2025

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#15 Precalculus - Hustle MAO National Convention 2025

For triangle ABC: AB = 8, BC = 12, and the area of triangle ABC is 36. What is the value of $\cos B$?

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#16 Precalculus - Hustle MAO National Convention 2025

Find the perimeter (in radians) of a sector with a central angle of $\frac{\pi}{4}$ and an area of 32π .

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#17 Precalculus - Hustle MAO National Convention 2025

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#18 Precalculus - Hustle MAO National Convention 2025

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Find the trace of the matrix:

$$\begin{bmatrix} 5 & 1 & 9 \\ 4 & -6 & 3 \\ -2 & 7 & 12 \end{bmatrix}$$

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#19 Precalculus - Hustle MAO National Convention 2025

Find the volume of the parallelepiped formed by the vectors < 2,5,-8 >, < 7,11,6 >, and < -5,8,7 >. (Disregard units)

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#20 Precalculus - Hustle MAO National Convention 2025

Convert 36°27′288" into degrees

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Answer		

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Answer: _____

Round 1 2 3 4 5

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#21 Precalculus - Hustle MAO National Convention 2025

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Compute:

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Answer: _____

Round 1 2 3 4 5

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#22 Precalculus - Hustle MAO National Convention 2025

Let $\frac{\pi}{2} < \alpha < \pi$ and $\frac{3\pi}{2} < \beta < 2\pi$, where $\tan(\alpha) = -\frac{4}{3}$ and $\cos(\beta) = \frac{5}{7}$. Find the value of the expression $\sin(-\beta - \alpha)$.

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#23 Precalculus - Hustle MAO National Convention 2025

Solve for *x*:

$$2^{2x+5} + 4^x = 528$$

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#24 Precalculus - Hustle MAO National Convention 2025

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#25 Precalculus - Hustle MAO National Convention 2025

Find the sum of the first ten terms in the geometric series:

$$\frac{1}{93}$$
, $\frac{1}{186}$, $\frac{1}{372}$, ...

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