

#1 Precalculus – Hustle
MA@ National Convention 2026

What is the maximum value of the function
 $y = 2 \sin x + 5 \cos x$?

Answer : _____

Round 1 2 3 4 5

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#2 Precalculus – Hustle
MAΘ National Convention 2026

What is the least common multiple of A and B
if $A = \langle -3, 4 \rangle \cdot \langle -4, 2 \rangle$ and $B = \|\langle 10, 24 \rangle\|$?

Answer : _____

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#3 Precalculus – Hustle
MA@ National Convention 2026

How many real solutions exist for the equation
 $x^5 - 6x^4 + 12x^3 - 12x^2 + 11x - 6 = 0$?

Answer : _____

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MA@ National Convention 2026

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#4 Precalculus – Hustle
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Evaluate:

$$\sum_{k=0}^{\infty} \frac{k + 2^k}{4^k}$$

Answer : _____

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#5 Precalculus – Hustle
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Find the eccentricity of the conic section with equation $2x^2 + 8x + 5y^2 - 60y = 12$.

Answer : _____

Round 1 2 3 4 5

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#6 Precalculus – Hustle
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Given that $f(2x - 1) = 2x^2 - 3x + 7$, find the product of the zeros of $f(x + 5)$.

Answer : _____

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#7 Precalculus – Hustle
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Compute the area bounded by the polar graph
 $r = 5 \sin(\theta)$.

Answer : _____

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#8 Precalculus – Hustle
MA@ National Convention 2026

Compute $\det \left(\begin{bmatrix} -2 & 4 & 0 \\ 3 & 1 & 1 \\ 0 & 1 & 0 \end{bmatrix} \begin{bmatrix} 4 & 2 & 0 \\ 1 & 6 & 7 \\ 3 & 0 & 1 \end{bmatrix} \right)$.

Answer : _____

Round 1 2 3 4 5

#8 Precalculus – Hustle
MA@ National Convention 2026

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#9 Precalculus – Hustle
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What is the product of the eigenvalues of the matrix $\begin{bmatrix} 6 & 8 \\ -1 & -3 \end{bmatrix}$?

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#10 Precalculus – Hustle
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Compute:

$$\lim_{x \rightarrow 3} \frac{\sqrt{x} - \sqrt{3}}{x - 3}$$

Answer : _____

Round 1 2 3 4 5

#10 Precalculus – Hustle
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#11 Precalculus – Hustle
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Find the amplitude of the function:

$$y = \sin x \cdot \prod_{k=0}^{2026} (\cos 2^k x)$$

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Round 1 2 3 4 5

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#12 Precalculus – Hustle
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How many ways are there to make a committee of 2 boys and 3 girls from a pool of 8 boys and 9 girls?

Answer : _____

Round 1 2 3 4 5

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#13 Precalculus – Hustle
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Simplify, leaving your answer in $a + bi$ form:

$$\frac{-3 + 4i}{3 + 4i} \cdot \frac{1 - 2i}{1 + 2i} \cdot \frac{12 + 16i}{-4 - 5i}$$

Answer : _____

Round 1 2 3 4 5

#13 Precalculus – Hustle
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#14 Precalculus – Hustle
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What is the units digit of $14^{14^{2026}}$?

Answer : _____

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#15 Precalculus – Hustle
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How many real solutions exist for the equation
 $\log_2(1 + \sqrt{x}) + \log_2(\sqrt{1+x}) - \log_2(2x) = 3$?

Answer : _____

Round 1 2 3 4 5

#15 Precalculus – Hustle
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#16 Precalculus – Hustle
MAΘ National Convention 2026

Compute: $i^2 \cdot (-i)^{-2} \cdot (1 + i)^2$

Answer : _____

Round 1 2 3 4 5

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Round 1 2 3 4 5

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Round 1 2 3 4 5

#17 Precalculus – Hustle
MA@ National Convention 2026

The equation $x^5 = 32$ has one real solution.
Let A be the product of the non-real solutions
and B be the sum of the non-real solutions.
Compute $\sqrt{A - B}$.

Answer : _____

Round 1 2 3 4 5

#17 Precalculus – Hustle
MA@ National Convention 2026

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Round 1 2 3 4 5

#18 Precalculus – Hustle
MA® National Convention 2026

What is the remainder then $f(x)$ is divided by $(x - 2)$ if:

$$f(x) = \prod_{n=1}^{2026} (x - n)$$

Answer : _____

Round 1 2 3 4 5

#18 Precalculus – Hustle
MA® National Convention 2026

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#19 Precalculus – Hustle
MAΘ National Convention 2026

Compute: $\sin\left(\frac{\pi}{24}\right)\cos\left(\frac{\pi}{24}\right)$

Answer : _____

Round 1 2 3 4 5

#19 Precalculus – Hustle
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#20 Precalculus – Hustle
MA@ National Convention 2026

The number $2026!$ ends in a string of n consecutive zeros. Compute the number of consecutive zeros at the end of $n!$.

Answer : _____

Round 1 2 3 4 5

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MA@ National Convention 2026

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#21 Precalculus – Hustle
MAΘ National Convention 2026

Find the constant term in the expansion of $\left(x^2 + 2x - \frac{3}{x}\right)^4$.

Answer : _____

Round 1 2 3 4 5

#21 Precalculus – Hustle
MAΘ National Convention 2026

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Answer : _____

Round 1 2 3 4 5

#22 Precalculus – Hustle
MAΘ National Convention 2026

What is the period of the function

$$y = \tan\left(\frac{\pi x}{3}\right) \cdot \sin\left(\frac{\pi x}{4}\right)?$$

Answer : _____

Round 1 2 3 4 5

#22 Precalculus – Hustle
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#23 Precalculus – Hustle
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Find the exact value of $\arctan(1) + \arctan(2) + \arctan(3)$, in radians.

Answer : _____

Round 1 2 3 4 5

#23 Precalculus – Hustle
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Answer : _____

Round 1 2 3 4 5

#24 Precalculus – Hustle
MA@ National Convention 2026

Compute the sum

$$\sum_{k=0}^4 \frac{5^k}{3^{k+2}}$$

Answer : _____

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Compute the sum

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Answer : _____

Round 1 2 3 4 5

#25 Precalculus – Hustle
MA@ National Convention 2026

Find the remainder when 3^{51} is divided by 19.

Answer : _____

Round 1 2 3 4 5

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Answer : _____

Round 1 2 3 4 5

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