#1 Trigonometry – Hustle
MAΘ National Convention 2016

Find the largest angle on the interval $\left[0, 2p\right)$ which satisfies $4\sin x \cos x = \sqrt{3}$.

Answer : _______________________

Round 1 2 3 4 5

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Round 1 2 3 4 5

#2 Trigonometry – Hustle
MAΘ National Convention 2016

Simplify:

$$\tan\frac{p}{4}\sin\frac{11p}{4}\cot\frac{18p}{4}+\sec 5p\cos\frac{p}{6}\tan\frac{7p}{6}.$$

Answer : _____

Round 1 2 3 4 5

#2 Trigonometry – Hustle
MAΘ National Convention 2016

Simplify:

$$\tan\frac{p}{4}\sin\frac{11p}{4}\cot\frac{18p}{4}+\sec 5p\cos\frac{p}{6}\tan\frac{7p}{6}.$$

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Answer : _____

Round 1 2 3 4 5

#3 Trigonometry – Hustle
MAΘ National Convention 2016

$\sin A = -\frac{5}{13}$ and $\cos A = \frac{12}{13}$. Find $\cos\frac{1}{2}A$.

Answer : _____

Round 1 2 3 4 5

#3 Trigonometry – Hustle
MAΘ National Convention 2016

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Answer : _____

Round 1 2 3 4 5

#4 Trigonometry – Hustle
MAΘ National Convention 2016

Find the perimeter of a sector of a circle whose central angle is 3 radians and whose radius is 6.

Answer : ______________________

Round 1 2 3 4 5

#4 Trigonometry – Hustle
MAΘ National Convention 2016

Find the perimeter of a sector of a circle whose central angle is 3 radians and whose radius is 6.

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Round 1 2 3 4 5

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MAΘ National Convention 2016

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Answer : ______________________

Round 1 2 3 4 5

#5 Trigonometry – Hustle
MAΘ National Convention 2016

Find the smallest positive value of x for which $\sin(3x+10)^\circ = \cos(4x+3)^\circ$.

Answer : ______________________

Round 1 2 3 4 5

#5 Trigonometry – Hustle
MAΘ National Convention 2016

Find the smallest positive value of x for which $\sin(3x+10)^\circ = \cos(4x+3)^\circ$.

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Round 1 2 3 4 5

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Round 1 2 3 4 5

#6 Trigonometry – Hustle
MAΘ National Convention 2016

Evaluate $\left[2\left(\cos\frac{p}{6}+i\sin\frac{p}{6}\right)\right]^{-3}$.

Answer : ______________________

Round 1 2 3 4 5

#6 Trigonometry – Hustle
MAΘ National Convention 2016

Evaluate $\left[2\left(\cos\frac{p}{6}+i\sin\frac{p}{6}\right)\right]^{-3}$.

Answer : ______________________

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MAΘ National Convention 2016

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Answer : ______________________

Round 1 2 3 4 5

#7 Trigonometry – Hustle
MAΘ National Convention 2016

Find the sum of the solutions of
$2\sin^2 x - 2\sin^2 x\cos x - \sin x\cos x + \sin x = 0$
over the interval $\left[0, 4\pi\right]$.

Answer : ______________________

Round 1 2 3 4 5

#7 Trigonometry – Hustle
MAΘ National Convention 2016

Find the sum of the solutions of
$2\sin^2 x - 2\sin^2 x\cos x - \sin x\cos x + \sin x = 0$
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over the interval $\left[0, 4\pi\right]$.

Answer : ______________________

Round 1 2 3 4 5

#8 Trigonometry – Hustle
MAΘ National Convention 2016

Using the interval $\left[0, 4\pi\right]$, find the equation of the rightmost vertical asymptote on the graph of $y = \tan\left(3x + \frac{7}{8}\pi\right)$.

Answer : _____

Round 1 2 3 4 5

#8 Trigonometry – Hustle
MAΘ National Convention 2016

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Round 1 2 3 4 5

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Answer : _____

Round 1 2 3 4 5

#9 Trigonometry – Hustle
MAΘ National Convention 2016

Evaluate $\lim_{q \to 0} \frac{1 - \cos q}{2\sin^2 q}$.

Answer : _____

Round 1 2 3 4 5

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MAΘ National Convention 2016

Evaluate $\lim_{q \to 0} \frac{1 - \cos q}{2\sin^2 q}$.

Answer : _____

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Answer : _____

Round 1 2 3 4 5

#10 Trigonometry – Hustle
MAΘ National Convention 2016

Evaluate
$\sin^2 1° + \sin^2 2° + \sin^2 3° + \sin^2 4° + ... + \sin^2 360°$.

Answer : ______________________

Round 1 2 3 4 5

#10 Trigonometry – Hustle
MAΘ National Convention 2016

Evaluate
$\sin^2 1° + \sin^2 2° + \sin^2 3° + \sin^2 4° + ... + \sin^2 360°$.

Answer : ______________________

Round 1 2 3 4 5

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$\sin^2 1° + \sin^2 2° + \sin^2 3° + \sin^2 4° + ... + \sin^2 360°$.

Answer : ______________________

Round 1 2 3 4 5

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MAΘ National Convention 2016

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$\sin^2 1° + \sin^2 2° + \sin^2 3° + \sin^2 4° + ... + \sin^2 360°$.

Answer : ______________________

Round 1 2 3 4 5

#11 Trigonometry – Hustle
MAΘ National Convention 2016

For how many values of x does
$x^2 - \sin x + 1 = 0$?

Answer : _____

Round 1 2 3 4 5

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$x^2 - \sin x + 1 = 0$?

Answer : _____

Round 1 2 3 4 5

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Round 1 2 3 4 5

#11 Trigonometry – Hustle
MAΘ National Convention 2016

For how many values of x does
$x^2 - \sin x + 1 = 0$?

Answer : _____

Round 1 2 3 4 5

#12 Trigonometry – Hustle
MAΘ National Convention 2016

Find the exact value of $\sin\left[\text{Cos}^{-1}\left(-\frac{2}{3}\right)\right]$.

Answer : ______________________

Round 1 2 3 4 5

#12 Trigonometry – Hustle
MAΘ National Convention 2016

Find the exact value of $\sin\left[\text{Cos}^{-1}\left(-\frac{2}{3}\right)\right]$.

Answer : ______________________

Round 1 2 3 4 5

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Answer : ______________________

Round 1 2 3 4 5

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Find the exact value of $\sin\left[\text{Cos}^{-1}\left(-\frac{2}{3}\right)\right]$.

Answer : ______________________

Round 1 2 3 4 5

#13 Trigonometry – Hustle
MAΘ National Convention 2016

Find the degree measure of the angle between the hour hand and minute hand of a clock at 4:15.

Answer : ______________________

Round 1 2 3 4 5

#13 Trigonometry – Hustle
MAΘ National Convention 2016

Find the degree measure of the angle between the hour hand and minute hand of a clock at 4:15.

Answer : ______________________

Round 1 2 3 4 5

#13 Trigonometry – Hustle
MAΘ National Convention 2016

Find the degree measure of the angle between the hour hand and minute hand of a clock at 4:15.

Answer : ______________________

Round 1 2 3 4 5

#13 Trigonometry – Hustle
MAΘ National Convention 2016

Find the degree measure of the angle between the hour hand and minute hand of a clock at 4:15.

Answer : ______________________

Round 1 2 3 4 5

#14 Trigonometry – Hustle
MAΘ National Convention 2016

Evaluate $\lim_{q \to 0} \frac{\sin 2q}{q}$

Answer : _____

Round 1 2 3 4 5

#14 Trigonometry – Hustle
MAΘ National Convention 2016

Evaluate $\lim_{q \to 0} \frac{\sin 2q}{q}$

Answer : _____

Round 1 2 3 4 5

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Round 1 2 3 4 5

#14 Trigonometry – Hustle
MAΘ National Convention 2016

Evaluate $\lim_{q \to 0} \frac{\sin 2q}{q}$

Answer : _____

Round 1 2 3 4 5

#15 Trigonometry – Hustle
MAΘ National Convention 2016

Find the amplitude of
$y=\sqrt{1-\cos 2x}+\sqrt{1+\cos 2x}$.

Answer : ______________________

Round 1 2 3 4 5

#15 Trigonometry – Hustle
MAΘ National Convention 2016

Find the amplitude of
$y=\sqrt{1-\cos 2x}+\sqrt{1+\cos 2x}$.

Answer : ______________________

Round 1 2 3 4 5

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Answer : ______________________

Round 1 2 3 4 5

#16 Trigonometry – Hustle
MAΘ National Convention 2016

If $\text{Tan}^{-1}\frac{5}{12}+2\text{Tan}^{-1}a=0$, what is the value of a?

Answer : _____

Round 1 2 3 4 5

#16 Trigonometry – Hustle
MAΘ National Convention 2016

If $\text{Tan}^{-1}\frac{5}{12}+2\text{Tan}^{-1}a=0$, what is the value of a?

Answer : _____

Round 1 2 3 4 5

#16 Trigonometry – Hustle
MAΘ National Convention 2016

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Round 1 2 3 4 5

#16 Trigonometry – Hustle
MAΘ National Convention 2016

If $\text{Tan}^{-1}\frac{5}{12}+2\text{Tan}^{-1}a=0$, what is the value of a?

Answer : _____

Round 1 2 3 4 5

#17 Trigonometry – Hustle
MAΘ National Convention 2016

Find the product of the three complex cube roots of 8.

Answer : _____

Round 1 2 3 4 5

#17 Trigonometry – Hustle
MAΘ National Convention 2016

Find the product of the three complex cube roots of 8.

Answer : _____

Round 1 2 3 4 5

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Answer : _____

Round 1 2 3 4 5

#17 Trigonometry – Hustle
MAΘ National Convention 2016

Find the product of the three complex cube roots of 8.

Answer : _____

Round 1 2 3 4 5

#18 Trigonometry – Hustle
MAΘ National Convention 2016

The domain of $f(x)=\ln\left(\sin 2\left(x-\frac{\pi}{4}\right)\right)$ on the interval $(0,2\pi)$ is $(A,B)\cup(C,D)$. Find the value of $A+B+C+D$.

Answer : _____

Round 1 2 3 4 5

#18 Trigonometry – Hustle
MAΘ National Convention 2016

The domain of $f(x)=\ln\left(\sin 2\left(x-\frac{\pi}{4}\right)\right)$ on the interval $(0,2\pi)$ is $(A,B)\cup(C,D)$. Find the value of $A+B+C+D$.

Answer : _____

Round 1 2 3 4 5

#18 Trigonometry – Hustle
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MAΘ National Convention 2016

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Answer : _____

Round 1 2 3 4 5

#19 Trigonometry – Hustle
MAΘ National Convention 2016

Find the sum of the periods of $f(x)=3\cot\frac{2}{3}x$, $g(x)=\left|\sin 4x\right|$, and $h(x)=\frac{1}{2}\sec\frac{3}{4}x$.

Answer : _____

Round 1 2 3 4 5

#19 Trigonometry – Hustle
MAΘ National Convention 2016

Find the sum of the periods of $f(x)=3\cot\frac{2}{3}x$, $g(x)=\left|\sin 4x\right|$, and $h(x)=\frac{1}{2}\sec\frac{3}{4}x$.

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Answer : _____

Round 1 2 3 4 5

#20 Trigonometry – Hustle
MAΘ National Convention 2016

Find the area enclosed by triangle ABC where $a=12, b=24,$ and Ð$C=135°$.

Answer : ______________________

Round 1 2 3 4 5

#20 Trigonometry – Hustle
MAΘ National Convention 2016

Find the area enclosed by triangle ABC where $a=12, b=24,$ and Ð$C=135°$.

Answer : ______________________

Round 1 2 3 4 5

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Answer : ______________________

Round 1 2 3 4 5

#20 Trigonometry – Hustle
MAΘ National Convention 2016

Find the area enclosed by triangle ABC where $a=12, b=24,$ and Ð$C=135°$.

Answer : ______________________

Round 1 2 3 4 5

#21 Trigonometry – Hustle
MAΘ National Convention 2016

Find the exact value of $\tan\left[2\text{Arcsin}\left(-\frac{15}{17}\right)\right]$.

Answer : _____

Round 1 2 3 4 5

#21 Trigonometry – Hustle
MAΘ National Convention 2016

Find the exact value of $\tan\left[2\text{Arcsin}\left(-\frac{15}{17}\right)\right]$.

Answer : _____

Round 1 2 3 4 5

#21 Trigonometry – Hustle
MAΘ National Convention 2016

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Answer : _____

Round 1 2 3 4 5

#21 Trigonometry – Hustle
MAΘ National Convention 2016

Find the exact value of $\tan\left[2\text{Arcsin}\left(-\frac{15}{17}\right)\right]$.

Answer : _____

Round 1 2 3 4 5

#22 Trigonometry – Hustle
MAΘ National Convention 2016

An angle x is chosen at random between 0 and 2p. What is the probability that $\sin x < 0.5$?

Answer : _______________________

Round 1 2 3 4 5

#22 Trigonometry – Hustle
MAΘ National Convention 2016

An angle x is chosen at random between 0 and 2p. What is the probability that $\sin x < 0.5$?

Answer : _______________________

Round 1 2 3 4 5

#22 Trigonometry – Hustle
MAΘ National Convention 2016

An angle x is chosen at random between 0 and 2p. What is the probability that $\sin x < 0.5$?

Answer : _______________________

Round 1 2 3 4 5

#22 Trigonometry – Hustle
MAΘ National Convention 2016

An angle x is chosen at random between 0 and 2p. What is the probability that $\sin x < 0.5$?

Answer : _______________________

Round 1 2 3 4 5

#23 Trigonometry – Hustle
MAΘ National Convention 2016

Find the number of solutions to $2^{\sin^2 x} = 4^{\cos x}$ on the interval $\left[-4\pi, 4\pi\right]$.

Answer : _____

Round 1 2 3 4 5

#23 Trigonometry – Hustle
MAΘ National Convention 2016

Find the number of solutions to $2^{\sin^2 x} = 4^{\cos x}$ on the interval $\left[-4\pi, 4\pi\right]$.

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Answer : _____

Round 1 2 3 4 5

#24 Trigonometry – Hustle
MAΘ National Convention 2016

For $0° < \theta < 180°$, $\dfrac{\cos\theta}{1+\sin\theta}$ is a root of $x^2 + 4x + 1 = 0$. What is the value of θ?

Answer : ______________________

Round 1 2 3 4 5

#24 Trigonometry – Hustle
MAΘ National Convention 2016

For $0° < \theta < 180°$, $\dfrac{\cos\theta}{1+\sin\theta}$ is a root of $x^2 + 4x + 1 = 0$. What is the value of θ?

Answer : ______________________

Round 1 2 3 4 5

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MAΘ National Convention 2016

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Round 1 2 3 4 5

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Answer : ______________________

Round 1 2 3 4 5

#25 Trigonometry – Hustle
MAΘ National Convention 2016

Evaluate without using trigonometric or inverse trigonometric functions, where $k > 0$:

$\sin\left(2\text{Arc}\tan\frac{k}{3}\right)$.

Answer : _____

Round 1 2 3 4 5

#25 Trigonometry – Hustle
MAΘ National Convention 2016

Evaluate without using trigonometric or inverse trigonometric functions, where $k > 0$:

$\sin\left(2\text{Arc}\tan\frac{k}{3}\right)$.

Answer : _____

Round 1 2 3 4 5

#25 Trigonometry – Hustle
MAΘ National Convention 2016

Evaluate without using trigonometric or inverse trigonometric functions, where $k > 0$:

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Round 1 2 3 4 5

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Answer : _____

Round 1 2 3 4 5