#1 Trig – Hustle
National MAΘ 2008

Find the phase shift of the trigonometric function:

$$y = -4\cos(\frac{\pi}{3}x - 1) + 2$$

Answer : _____

Round 1 2 3 4 5

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National MAΘ 2008

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National MAΘ 2008

Find the phase shift of the trigonometric function:

$$y = -4\cos(\frac{\pi}{3}x - 1) + 2$$

Answer : _____

Round 1 2 3 4 5

#2 Trig – Hustle
National MAΘ 2008

Simplify the following expression to one of the form $\mathbf{A}\sin^{\mathbf{B}}\mathbf{x}$: $2\left(\frac{1-\sec^2 x}{\sec^2 x}\right)\frac{2}{\csc x}$

Find A + B.

Answer : _____

Round 1 2 3 4 5

#2 Trig – Hustle
National MAΘ 2008

Simplify the following expression to one of the form $\mathbf{A}\sin^{\mathbf{B}}\mathbf{x}$: $2\left(\frac{1-\sec^2 x}{\sec^2 x}\right)\frac{2}{\csc x}$

Find A + B.

Answer : _____

Round 1 2 3 4 5

#2 Trig – Hustle
National MAΘ 2008

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Round 1 2 3 4 5

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National MAΘ 2008

Simplify the following expression to one of the form $\mathbf{A}\sin^{\mathbf{B}}\mathbf{x}$: $2\left(\frac{1-\sec^2 x}{\sec^2 x}\right)\frac{2}{\csc x}$

Find A + B.

Answer : _____

Round 1 2 3 4 5

#3 Trig – Hustle
National MAΘ 2008

In Triangle ABC, angle A is 60°, side b is 6 m, and angle C is thirty more than one half angle B. Find the sum of the number of degrees in angle B and the number of meters in side C.

Answer : _____________

Round 1 2 3 4 5

#3 Trig – Hustle
National MAΘ 2008

In Triangle ABC, angle A is 60°, side b is 6 m, and angle C is thirty more than one half angle B. Find the sum of the number of degrees in angle B and the number of meters in side C.

Answer : _____________

Round 1 2 3 4 5

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In Triangle ABC, angle A is 60°, side b is 6 m, and angle C is thirty more than one half angle B. Find the sum of the number of degrees in angle B and the number of meters in side C.

Answer : _____________

Round 1 2 3 4 5

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National MAΘ 2008

In Triangle ABC, angle A is 60°, side b is 6 m, and angle C is thirty more than one half angle B. Find the sum of the number of degrees in angle B and the number of meters in side C.

Answer : _____________

Round 1 2 3 4 5

#4 Trig – Hustle
National MAΘ 2008

Find the perimeter of triangle UCF if u = 4, c = 8, and F = 120˚.

Answer : _____

Round 1 2 3 4 5

#4 Trig – Hustle
National MAΘ 2008

Find the perimeter of triangle UCF if u = 4, c = 8, and F = 120˚.

Answer : _____

Round 1 2 3 4 5

#4 Trig – Hustle
National MAΘ 2008

Find the perimeter of triangle UCF if u = 4, c = 8, and F = 120˚.

Answer : _____

Round 1 2 3 4 5

#4 Trig – Hustle
National MAΘ 2008

Find the perimeter of triangle UCF if u = 4, c = 8, and F = 120˚.

Answer : _____

Round 1 2 3 4 5

#5 Trig – Hustle
National MAΘ 2008

$\cos(7x) - \cos(3x) = A\sin Bx \sin Cx$

$Find : |A| + |B| + |C|$

Answer : ____________

Round 1 2 3 4 5

#5 Trig – Hustle
National MAΘ 2008

$\cos(7x) - \cos(3x) = A\sin Bx \sin Cx$

$Find : |A| + |B| + |C|$

Answer : ____________

Round 1 2 3 4 5

#5 Trig – Hustle
National MAΘ 2008

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Answer : ____________

Round 1 2 3 4 5

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National MAΘ 2008

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$Find : |A| + |B| + |C|$

Answer : ____________

Round 1 2 3 4 5

#6 Trig – Hustle
National MAΘ 2008

$\cos x = \frac{-9}{15}, \sin y = \frac{5}{13}, \frac{\pi}{2} \le x \le \pi, \frac{\pi}{2} \le y \le \pi$

$\sin(x+y) = ?$

Give answer as a simplified fraction.

Answer : _____

Round 1 2 3 4 5

#6 Trig – Hustle
National MAΘ 2008

$\cos x = \frac{-9}{15}, \sin y = \frac{5}{13}, \frac{\pi}{2} \le x \le \pi, \frac{\pi}{2} \le y \le \pi$

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Round 1 2 3 4 5

#6 Trig – Hustle
MAΘ National Convention 2007

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$\sin(x+y) = ?$

Give answer as a simplified fraction.

Answer : _____

Round 1 2 3 4 5

#7 Trig – Hustle
National MAΘ 2008

$$Arc\sin(\cos(Arc\tan(\frac{-1}{\sqrt{3}}))) = ?$$

Answer : _____

Round 1 2 3 4 5

#7 Trig – Hustle
National MAΘ 2008

$$Arc\sin(\cos(Arc\tan(\frac{-1}{\sqrt{3}}))) = ?$$

Answer : _____

Round 1 2 3 4 5

#7 Trig – Hustle
National MAΘ 2008

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Answer : _____

Round 1 2 3 4 5

#7 Trig – Hustle
National MAΘ 2008

$$Arc\sin(\cos(Arc\tan(\frac{-1}{\sqrt{3}}))) = ?$$

Answer : _____

Round 1 2 3 4 5

#8 Trig – Hustle
National MAΘ 2008

$$\cos^2 x \begin{vmatrix} 1 & \sec x \\ \sec x & 1 \end{vmatrix} = A \sin^B x$$

Find : $A - B$.

Answer : _____

Round 1 2 3 4 5

#8 Trig – Hustle
National MAΘ 2008

$$\cos^2 x \begin{vmatrix} 1 & \sec x \\ \sec x & 1 \end{vmatrix} = A \sin^B x$$

Find : $A - B$.

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Round 1 2 3 4 5

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Find : $A - B$.

Answer : _____

Round 1 2 3 4 5

#9 Trig – Hustle
National MAΘ 2008

Solve for x:

$2\sin^2 x + 7\sin x + 3 = 0$
$-\pi \le x \le 0$

Answer : _____

Round 1 2 3 4 5

#9 Trig – Hustle
National MAΘ 2008

Solve for x:

$2\sin^2 x + 7\sin x + 3 = 0$
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Solve for x:

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Answer : _____

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#9 Trig – Hustle
National MAΘ 2008

Solve for x:

$2\sin^2 x + 7\sin x + 3 = 0$
$-\pi \le x \le 0$

Answer : _____

Round 1 2 3 4 5

#10 Trig – Hustle
National MAΘ 2008

Find the maximum value:

$y = -2\sin(4x - \pi) + 1$

Answer : _____

Round 1 2 3 4 5

#10 Trig – Hustle
National MAΘ 2008

Find the maximum value:

$y = -2\sin(4x - \pi) + 1$

Answer : _____

Round 1 2 3 4 5

#10 Trig – Hustle
National MAΘ 2008

Find the maximum value:

$y = -2\sin(4x - \pi) + 1$

Answer : _____

Round 1 2 3 4 5

#10 Trig – Hustle
MAΘ National Convention 2007

Find the maximum value:

$y = -2\sin(4x - \pi) + 1$

Answer : _____

Round 1 2 3 4 5

#11 Trig – Hustle
National MAΘ 2008

$\cos y = x^2 - 2$

$\cos 2y = Ax^4 + Bx^2 + C$

$Find: A + B + C.$

Answer : _____

Round 1 2 3 4 5

#11 Trig – Hustle
National MAΘ 2008

$\cos y = x^2 - 2$

$\cos 2y = Ax^4 + Bx^2 + C$

$Find: A + B + C.$

Answer : _____

Round 1 2 3 4 5

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National MAΘ 2008

$\cos y = x^2 - 2$

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$Find: A + B + C.$

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Round 1 2 3 4 5

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National MAΘ 2008

$\cos y = x^2 - 2$

$\cos 2y = Ax^4 + Bx^2 + C$

$Find: A + B + C.$

Answer : _____

Round 1 2 3 4 5

#12 Trig – Hustle
National MAΘ 2008

Given: $0 \le \theta \le \frac{\pi}{2}$

$\cos\theta = x^2$

$\cot\theta = ?$

Answer : _____

Round 1 2 3 4 5

#12 Trig – Hustle
National MAΘ 2008

Given: $0 \le \theta \le \frac{\pi}{2}$

$\cos\theta = x^2$

$\cot\theta = ?$

Answer : _____

Round 1 2 3 4 5

#12 Trig – Hustle
National MAΘ 2008

Given: $0 \le \theta \le \frac{\pi}{2}$

$\cos\theta = x^2$

$\cot\theta = ?$

Answer : _____

Round 1 2 3 4 5

#12 Trig – Hustle
National MAΘ 2008

Given: $0 \le \theta \le \frac{\pi}{2}$

$\cos\theta = x^2$

$\cot\theta = ?$

Answer : _____

Round 1 2 3 4 5

#13 Trig – Hustle
National MAΘ 2008

$Given: 0 < y < \frac{\pi}{2}$

$2\sin y - 4\sin y \cos y = 0$

$\sin(2y) = ?$

Answer : _____

Round 1 2 3 4 5

#13 Trig – Hustle
National MAΘ 2008

$Given: 0 < y < \frac{\pi}{2}$

$2\sin y - 4\sin y \cos y = 0$

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Round 1 2 3 4 5

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National MAΘ 2008

$Given: 0 < y < \frac{\pi}{2}$

$2\sin y - 4\sin y \cos y = 0$

$\sin(2y) = ?$

Answer : _____

Round 1 2 3 4 5

#14 Trig – Hustle
National MAΘ 2008

P = period of the function
A = vertical shift of the function

Find P/A.

$$y = -3\tan(\frac{2\pi x}{3} - 1) + 5$$

Answer : _____

Round 1 2 3 4 5

National MAΘ 2008

P = period of the function
A = vertical shift of the function

Find P/A.

$$y = -3\tan(\frac{2\pi x}{3} - 1) + 5$$

Answer : _____

Round 1 2 3 4 5

#14 Trig – Hustle
National MAΘ 2008

P = period of the function
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Find P/A.

$$y = -3\tan(\frac{2\pi x}{3} - 1) + 5$$

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Round 1 2 3 4 5

#14 Trig – Hustle
National MAΘ 2008

P = period of the function
A = vertical shift of the function

Find P/A.

$$y = -3\tan(\frac{2\pi x}{3} - 1) + 5$$

Answer : _____

Round 1 2 3 4 5

#14 Trig – Hustle

#15 Trig – Hustle
National MAΘ 2008

Find the area of triangle ABC if a = 8, b = 12, and angle C = 45˚.

Answer : _____

Round 1 2 3 4 5

#15 Trig – Hustle
National MAΘ 2008

Find the area of triangle ABC if a = 8, b = 12, and angle C = 45˚.

Answer : _____

Round 1 2 3 4 5

#15 Trig – Hustle
National MAΘ 2008

Find the area of triangle ABC if a = 8, b = 12, and angle C = 45˚.

Answer : _____

Round 1 2 3 4 5

#15 Trig – Hustle
National MAΘ 2008

Find the area of triangle ABC if a = 8, b = 12, and angle C = 45˚.

Answer : _____

Round 1 2 3 4 5

#16 Trig – Hustle
National MAΘ 2008

$$\cos\left(\frac{5\pi}{12}\right) = \frac{\sqrt{x-\sqrt{y}}}{x}$$

$x + y = ?$

Answer : _____

Round 1 2 3 4 5

#16 Trig – Hustle
National MAΘ 2008

$$\cos\left(\frac{5\pi}{12}\right) = \frac{\sqrt{x-\sqrt{y}}}{x}$$

$x + y = ?$

Answer : _____

Round 1 2 3 4 5

#16 Trig – Hustle
National MAΘ 2008

$$\cos\left(\frac{5\pi}{12}\right) = \frac{\sqrt{x-\sqrt{y}}}{x}$$

$x + y = ?$

Answer : _____

Round 1 2 3 4 5

#16 Trig – Hustle
National MAΘ 2008

$$\cos\left(\frac{5\pi}{12}\right) = \frac{\sqrt{x-\sqrt{y}}}{x}$$

$x + y = ?$

Answer : _____

Round 1 2 3 4 5

#17 Trig – Hustle
National MAΘ 2008

$x = 4(\cos\frac{3\pi}{4} + i\sin\frac{3\pi}{4})$

$y = 6(\cos\frac{5\pi}{4} + i\sin\frac{5\pi}{4})$

Find : xy.

Answer : _____

Round 1 2 3 4 5

#17 Trig – Hustle
National MAΘ 2008

$x = 4(\cos\frac{3\pi}{4} + i\sin\frac{3\pi}{4})$

$y = 6(\cos\frac{5\pi}{4} + i\sin\frac{5\pi}{4})$

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Round 1 2 3 4 5

#17 Trig – Hustle
National MAΘ 2008

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Round 1 2 3 4 5

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$y = 6(\cos\frac{5\pi}{4} + i\sin\frac{5\pi}{4})$

Find : xy.

Answer : _____

Round 1 2 3 4 5

#18 Trig – Hustle
National MAΘ 2008

In triangle ABC; $c = 10$, $a = 20$, and $C = 30^\circ$. Find the sum of all possible values of angle B in degrees.

Answer : _____________

Round 1 2 3 4 5

#18 Trig – Hustle
National MAΘ 2008

In triangle ABC; $c = 10$, $a = 20$, and $C = 30^\circ$. Find the sum of all possible values of angle B in degrees.

Answer : _____________

Round 1 2 3 4 5

#18 Trig – Hustle
National MAΘ 2008

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National MAΘ 2008

In triangle ABC; $c = 10$, $a = 20$, and $C = 30^\circ$. Find the sum of all possible values of angle B in degrees.

Answer : _____________

Round 1 2 3 4 5

#19 Trig – Hustle
National MAΘ 2008

Eric is dying for a Mountain Dew. He is in a town where he doesn't know his way around really well. He leaves his hotel heading north for 20 miles. He turns east and goes 10 more miles. Eric gets really, really thirsty and decides to go 50 miles south looking for his Mountain Dew. He turns east again and goes 5 more miles. One last ditch attempt: 15 miles north. Now that he has himself completely lost, what bearing in degrees is Eric at with respect to his hotel?

Answer : _____

Round 1 2 3 4 5

#19 Trig – Hustle
National MAΘ 2008

Eric is dying for a Mountain Dew. He is in a town where he doesn't know his way around really well. He leaves his hotel heading north for 20 miles. He turns east and goes 10 more miles. Eric gets really, really thirsty and decides to go 50 miles south looking for his Mountain Dew. He turns east again and goes 5 more miles. One last ditch attempt: 15 miles north. Now that he has himself completely lost, what bearing in degrees is Eric at with respect to his hotel?

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National MAΘ 2008

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Round 1 2 3 4 5

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National MAΘ 2008

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Answer : _____

Round 1 2 3 4 5

#20 Trig – Hustle
National MAΘ 2008

Jack and Jill are flying kites. They both are flying at a height of 12 meters. Jack's cord is 20 meters, and Jill's is 15 meters. Find the shortest distance in meters that Jack can stand away from Jill and have his kite intersect hers.

Answer : _____

Round 1 2 3 4 5

#20 Trig – Hustle
National MAΘ 2008

Jack and Jill are flying kites. They both are flying at a height of 12 meters. Jack's cord is 20 meters, and Jill's is 15 meters. Find the shortest distance in meters that Jack can stand away from Jill and have his kite intersect hers.

Answer : _____

Round 1 2 3 4 5

#20 Trig – Hustle
National MAΘ 2008

Jack and Jill are flying kites. They both are flying at a height of 12 meters. Jack's cord is 20 meters, and Jill's is 15 meters. Find the shortest distance in meters that Jack can stand away from Jill and have his kite intersect hers.

Answer : _____

Round 1 2 3 4 5

#20 Trig – Hustle
National MAΘ 2008

Jack and Jill are flying kites. They both are flying at a height of 12 meters. Jack's cord is 20 meters, and Jill's is 15 meters. Find the shortest distance in meters that Jack can stand away from Jill and have his kite intersect hers.

Answer : _____

Round 1 2 3 4 5

#21 Trig – Hustle
National MAΘ 2008

$$\cot(\sin^{-1}(\frac{4}{\sqrt{x^2+16}})$$

Answer : _____

Round 1 2 3 4 5

#21 Trig – Hustle
National MAΘ 2008

$$\cot(\sin^{-1}(\frac{4}{\sqrt{x^2+16}})$$

Answer : _____

Round 1 2 3 4 5

#21 Trig – Hustle
National MAΘ 2008

$$\cot(\sin^{-1}(\frac{4}{\sqrt{x^2+16}})$$

Answer : _____

Round 1 2 3 4 5

#21 Trig – Hustle
National MAΘ 2008

$$\cot(\sin^{-1}(\frac{4}{\sqrt{x^2+16}})$$

Answer : _____

Round 1 2 3 4 5

#22 Trig – Hustle
National MAΘ 2008

$$\sum_{i=1}^{15} \cos(i\pi) + \sin(i\pi) = ?$$

Answer : _____

Round 1 2 3 4 5

#22 Trig – Hustle
National MAΘ 2008

$$\sum_{i=1}^{15} \cos(i\pi) + \sin(i\pi) = ?$$

Answer : _____

Round 1 2 3 4 5

#22 Trig – Hustle
National MAΘ 2008

$$\sum_{i=1}^{15} \cos(i\pi) + \sin(i\pi) = ?$$

Answer : _____

Round 1 2 3 4 5

#22 Trig – Hustle
National MAΘ 2008

$$\sum_{i=1}^{15} \cos(i\pi) + \sin(i\pi) = ?$$

Answer : _____

Round 1 2 3 4 5

#23 Trig – Hustle
National MAΘ 2008

In triangle XYZ, <X = 30˚ , <Y = 45˚ , and x = 12 units. Find y.

Answer : _____

Round 1 2 3 4 5

#23 Trig – Hustle
National MAΘ 2008

In triangle XYZ, <X = 30˚ , <Y = 45˚ , and x = 12 units. Find y.

Answer : _____

Round 1 2 3 4 5

#23 Trig – Hustle
National MAΘ 2008

In triangle XYZ, <X = 30˚ , <Y = 45˚ , and x = 12 units. Find y.

Answer : _____

Round 1 2 3 4 5

#23 Trig – Hustle
National MAΘ 2008

In triangle XYZ, <X = 30˚ , <Y = 45˚ , and x = 12 units. Find y.

Answer : _____

Round 1 2 3 4 5

#24 Trig – Hustle
National MAΘ 2008

$$\frac{\sin 105}{z} = \frac{\sin 30}{12}$$

If z is of the form $z = \alpha\sqrt{6} + \beta\sqrt{2}$,
find α+β.

Answer : _____

Round 1 2 3 4 5

#24 Trig – Hustle
National MAΘ 2008

$$\frac{\sin 105}{z} = \frac{\sin 30}{12}$$

If z is of the form $z = \alpha\sqrt{6} + \beta\sqrt{2}$,
find α+β.

Answer : _____

Round 1 2 3 4 5

#24 Trig – Hustle
National MAΘ 2008

$$\frac{\sin 105}{z} = \frac{\sin 30}{12}$$

If z is of the form $z = \alpha\sqrt{6} + \beta\sqrt{2}$,
find α+β.

Answer : _____

Round 1 2 3 4 5

#24 Trig – Hustle
National MAΘ 2008

$$\frac{\sin 105}{z} = \frac{\sin 30}{12}$$

If z is of the form $z = \alpha\sqrt{6} + \beta\sqrt{2}$,
find α+β.

Answer : _____

Round 1 2 3 4 5

#25 Trig – Hustle
National MAΘ 2008

$\cos(\frac{-11\pi}{6}) = ?$

Answer : _____

Round 1 2 3 4 5

#25 Trig – Hustle
National MAΘ 2008

$\cos(\frac{-11\pi}{6}) = ?$

Answer : _____

Round 1 2 3 4 5

#25 Trig – Hustle
National MAΘ 2008

$\cos(\frac{-11\pi}{6}) = ?$

Answer : _____

Round 1 2 3 4 5

#25 Trig – Hustle
National MAΘ 2008

$\cos(\frac{-11\pi}{6}) = ?$

Answer : _____

Round 1 2 3 4 5