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

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

Answer : \_\_\_\_\_\_

Answer : \_\_\_\_\_

Round 1 2 3 4 5

Round 1 2 3 4 5

#### #1 Trig – Hustle National MA© 2008

#1 Trig – Hustle National MAΘ 2008

Find the phase shift of the trigonometric function:

Find the phase shift of the trigonometric function:

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

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

Answer : \_\_\_\_\_

Answer : \_\_\_\_\_

Round 1 2 3 4 5

# #2 Trig - Hustle National MA<sub>O</sub> 2008

# Simplify the following expression to one of the

form 
$$\mathbf{A}\mathbf{sin}^{\mathbf{B}}\mathbf{x}$$
:  $2(\frac{1-\sec^2 x}{\sec^2 x})\frac{2}{\csc^2 x}$ 

Find 
$$A + B$$
.

#### Answer : \_\_\_\_\_

# Round 1 2 3 4 5

# $2(\frac{1-\sec^2 x}{\sec^2 x})\frac{2}{\csc x}$

# Simplify the following expression to one of the

form 
$$\mathbf{A}\mathbf{sin}^{\mathbf{B}}\mathbf{x}$$
:  $2(\frac{1-\sec^2 x}{\sec^2 x})\frac{2}{\csc x}$ 

Find 
$$A + B$$
.

#2 Trig - Hustle

National MA<sub>O</sub> 2008

#### Answer : \_\_\_\_\_

#### Round 1 2 3 4 5

# #2 Trig – Hustle National MA<sub>O</sub> 2008

# Simplify the following expression to one of the

form 
$$\mathbf{A}\mathbf{sin}^{\mathbf{B}}\mathbf{x}$$
:  $2(\frac{1-\sec^2 x}{\sec^2 x})\frac{2}{\csc x}$ 

Find 
$$A + B$$
.

# Answer : \_\_\_\_\_

# #2 Trig - Hustle National MA<sub>O</sub> 2008

# Simplify the following expression to one of the

form 
$$\mathbf{A}\sin^{\mathbf{B}}\mathbf{x}$$
:  $2(\frac{1-\sec^2 x}{\sec^2 x})\frac{2}{\csc x}$ 

Find 
$$A + B$$
.

#### Answer : \_\_\_\_\_

#### #3 Trig – Hustle National MA© 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.

#### #3 Trig – Hustle National MA© 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	•		
-X 113 W C1	•		

Round 1 2 3 4 5

Answer : \_\_\_\_\_

Round 1 2 3 4 5

#### #3 Trig − Hustle National MA⊕ 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.

#### #3 Trig – Hustle National MAO 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

Answer : \_\_\_\_\_

#4 Trig – Hustle National MAΘ 2008	#4 Trig – Hustle National MAΘ 2008
Find the perimeter of triangle UCF if $u = 4$ , $c = 8$ , and $F = 120^{\circ}$ .	Find the perimeter of triangle UCF if $u = 4$ , $c = 8$ , and $F = 120^{\circ}$ .
Answer :	Answer :
Round 1 2 3 4 5	Round 1 2 3 4 5
#4 Trig – Hustle National MAΘ 2008	#4 Trig – Hustle National MAΘ 2008
Find the perimeter of triangle UCF if $u = 4$ , $c = 8$ , and $F = 120^{\circ}$ .	Find the perimeter of triangle UCF if $u = 4$ , $c = 8$ , and $F = 120^{\circ}$ .

Answer : \_\_\_\_\_

Round 1 2 3 4 5

Answer : \_\_\_\_\_\_

# #5 Trig – Hustle National MA⊕ 2008

 $\cos(7x) - \cos(3x) = A\sin Bx \sin Cx$ Find: |A| + |B| + |C|

# #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

Answer : \_\_\_\_\_

Round 1 2 3 4 5

# #5 Trig – Hustle National MA⊕ 2008

 $\cos(7x) - \cos(3x) = A\sin Bx \sin Cx$ Find: |A| + |B| + |C| #5 Trig – Hustle National MA© 2008

 $\cos(7x) - \cos(3x) = A\sin Bx \sin Cx$ Find: |A| + |B| + |C|

Answer : \_\_\_\_\_

Round 1 2 3 4 5

Round 1 2 3 4 5

Answer : \_\_\_\_\_

# #6 Trig – Hustle National MA@ 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 MA@ 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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Give answer as a simplified fraction.

Answer : \_\_\_\_\_

Round 1 2 3 4 5

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Give answer as a simplified fraction.

Answer : \_\_\_\_\_\_

Round 1 2 3 4 5

#### #6 Trig – Hustle MAΘ National Convention 2007

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

Give answer as a simplified fraction.

Answer : \_\_\_\_\_

# #7 Trig – Hustle National MAΘ 2008

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

# #7 Trig – Hustle National MAΘ 2008

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

Answer : \_\_\_\_\_

Round 1 2 3 4 5

Answer : \_\_\_\_\_

Round 1 2 3 4 5

# #7 Trig – Hustle National MA⊕ 2008

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#7 Trig – Hustle National MA⊕ 2008

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

Answer : \_\_\_\_\_

Round 1 2 3 4 5

Answer : \_\_\_\_\_

# #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.

#### #8 Trig – Hustle National MA© 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

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.

# #8 Trig – Hustle National MAO 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

Answer : \_\_\_\_\_

# #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 MA⊕ 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

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

#### Answer : \_\_\_\_\_

#### Round 1 2 3 4 5

#### #9 Trig – Hustle National MA⊕ 2008

#### Solve for x:

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

Answer : \_\_\_\_\_

#10 Trig – Hus	tle
National MA®	2008

# #10 Trig – Hustle National MAO 2008

Find the maximum value:

Find the maximum value:

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

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

Answer : \_\_\_\_\_\_

Answer : \_\_\_\_\_

Round 1 2 3 4 5

Round 1 2 3 4 5

# #10 Trig – Hustle National MAO 2008

#10 Trig – Hustle MAO National Convention 2007

Find the maximum value:

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

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

Answer : \_\_\_\_\_

Answer : \_\_\_\_\_

Round 1 2 3 4 5

#11 Trig – Hustle National MA© 2008

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

Find: A + B + C.

#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

Answer : \_\_\_\_\_

Round 1 2 3 4 5

#11 Trig – Hustle National MA⊕ 2008

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

Find: A + B + C.

#11 Trig – Hustle National MAO 2008

 $\cos y = x^2 - 2$ 

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

Find: A+B+C.

Answer : \_\_\_\_\_\_

Round 1 2 3 4 5

Answer : \_\_\_\_\_\_

# #12 Trig – Hustle National MA© 2008

# Given: $0 \le \theta \le \frac{\pi}{2}$ $\cos \theta = x^2$ $\cot \theta = ?$

# #12 Trig – Hustle National MAO 2008

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

$$\cos \theta = x^2$$

$$\cot \theta = ?$$

Answer	:	

# #12 Trig – Hustle National MAO 2008

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

$$\cos \theta = x^2$$

$$\cot \theta = ?$$

# #12 Trig – Hustle National MAO 2008

Given: 
$$0 \le \theta \le \frac{\pi}{2}$$
  
 $\cos \theta = x^2$   
 $\cot \theta = ?$ 

# #13 Trig – Hustle National MAO 2008

# Given: $0 < y < \frac{\pi}{2}$ $2\sin y - 4\sin y \cos y = 0$ $\sin(2y) = ?$

# #13 Trig – Hustle National MAO 2008

Given: 
$$0 < y < \frac{\pi}{2}$$
  
 $2 \sin y - 4 \sin y \cos y = 0$   
 $\sin(2y) = ?$ 

A						
Answer	:					

# Answer : \_\_\_\_\_

# Round 1 2 3 4 5

# #13 Trig – Hustle National MAO 2008

Given: 
$$0 < y < \frac{\pi}{2}$$
  
 $2 \sin y - 4 \sin y \cos y = 0$   
 $\sin(2y) = ?$ 

# #13 Trig – Hustle National MAO 2008

Given: 
$$0 < y < \frac{\pi}{2}$$
  
 $2 \sin y - 4 \sin y \cos y = 0$   
 $\sin(2y) = ?$ 

Answer : \_\_\_\_\_

Answer : \_\_\_\_\_

Round 1 2 3 4 5

#### #14 Trig – Hustle National MA© 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 MA<sub>O</sub> 2008

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

Find P/A.

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

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Round 1 2 3 4 5

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Round 1 2 3 4 5

#### #14 Trig – Hustle National MA© 2008

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Find P/A.

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

Answer : \_\_\_\_\_

#15 Trig	<ul><li>Hus</li></ul>	tle
National	ΜΑΘ	2008

Find the area of triangle ABC if a = 8, b = 12, and angle  $C = 45^{\circ}$ .

# #15 Trig – Hustle National MAO 2008

Find the area of triangle ABC if a = 8, b = 12, and angle  $C = 45^{\circ}$ .

Answer : \_\_\_\_\_

Answer : \_\_\_\_\_

Round 1 2 3 4 5

Round 1 2 3 4 5

# #15 Trig – Hustle National MAO 2008

Find the area of triangle ABC if a = 8, b = 12, and angle  $C = 45^{\circ}$ .

#15 Trig – Hustle National MAO 2008

Find the area of triangle ABC if a = 8, b = 12, and angle  $C = 45^{\circ}$ .

Answer : \_\_\_\_\_\_

Answer : \_\_\_\_\_\_

Round 1 2 3 4 5

#16 Trig – Hustle National MA@ 2008

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

#16 Trig – Hustle National MAΘ 2008

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

Answer : \_\_\_\_\_

Round 1 2 3 4 5

Answer : \_\_\_\_\_

Round 1 2 3 4 5

#16 Trig – Hustle National MA⊕ 2008

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

#16 Trig – Hustle National MA⊕ 2008

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

Answer : \_\_\_\_\_

Round 1 2 3 4 5

Answer : \_\_\_\_\_

# #17 Trig – Hustle National MA© 2008

# $x = 4\left(\cos\frac{3\pi}{4} + i\sin\frac{3\pi}{4}\right)$ $y = 6\left(\cos\frac{5\pi}{4} + i\sin\frac{5\pi}{4}\right)$

Find: xy.

# #17 Trig – Hustle National MAO 2008

$$x = 4\left(\cos\frac{3\pi}{4} + i\sin\frac{3\pi}{4}\right)$$
$$y = 6\left(\cos\frac{5\pi}{4} + i\sin\frac{5\pi}{4}\right)$$
$$Find: xy.$$

Answer : \_\_\_\_\_

Round 1 2 3 4 5

Answer : \_\_\_\_\_

Round 1 2 3 4 5

# #17 Trig – Hustle National MA© 2008

$$x = 4\left(\cos\frac{3\pi}{4} + i\sin\frac{3\pi}{4}\right)$$
$$y = 6\left(\cos\frac{5\pi}{4} + i\sin\frac{5\pi}{4}\right)$$

Find: xy.

# #17 Trig – Hustle National MAO 2008

$$x = 4\left(\cos\frac{3\pi}{4} + i\sin\frac{3\pi}{4}\right)$$
$$y = 6\left(\cos\frac{5\pi}{4} + i\sin\frac{5\pi}{4}\right)$$

Find: xy.

Answer : \_\_\_\_\_\_

Round 1 2 3 4 5

Answer : \_\_\_\_\_\_

#### #18 Trig – Hustle National MA© 2008

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

# #18 Trig – Hustle National MAO 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	•			
AIISWU	•			

Round 1 2 3 4 5

#### Answer : \_\_\_\_\_

#### Round 1 2 3 4 5

# #18 Trig – Hustle National MAO 2008

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

# #18 Trig – Hustle National MAO 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

Answer : \_\_\_\_\_

#### #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 MA© 2008

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#### Round 1 2 3 4 5

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Answer	•	
AllSWCI	•	

#### Round 1 2 3 4 5

#### #19 Trig – Hustle National MAΘ 2008

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Answer	:	

#### #20 Trig – Hustle National MA© 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.

#### #20 Trig – Hustle National MA© 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 :	Answer:	
<del></del>		

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.

#### #20 Trig – Hustle National MA© 2008

Round 1 2 3 4 5

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 :				Answer	Answer :						
Round	1	2.	3	4	5	Round	1	2	3	4	5

- #21 Trig Hustle National MAΘ 2008
- $\cot(\sin^{-1}(\frac{4}{\sqrt{x^2+16}})$

- #21 Trig Hustle National MAΘ 2008
- $\cot(\sin^{-1}(\frac{4}{\sqrt{x^2+16}})$

- Answer : \_\_\_\_\_
- Round 1 2 3 4 5

- Answer : \_\_\_\_\_
- Round 1 2 3 4 5

#21 Trig – Hustle National MAΘ 2008

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

#21 Trig – Hustle National MAΘ 2008

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

- Answer : \_\_\_\_\_\_
- Round 1 2 3 4 5

- Answer : \_\_\_\_\_\_
- Round 1 2 3 4 5

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

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

Answer : \_\_\_\_\_

Answer : \_\_\_\_\_

Round 1 2 3 4 5

Round 1 2 3 4 5

#22 Trig – Hustle National MA⊕ 2008

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

#22 Trig – Hustle National MA© 2008

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

Answer : \_\_\_\_\_\_

Answer : \_\_\_\_\_

Round 1 2 3 4 5

#23 Trig	- Hus	tle
National	ΜΑΘ	2008

In triangle XYZ, <X =  $30^{\circ}$  , <Y =  $45^{\circ}$  , and x = 12 units. Find y.

#### #23 Trig – Hustle National MAΘ 2008

Answer : \_\_\_\_\_

In triangle XYZ, <X =  $30^{\circ}$  , <Y =  $45^{\circ}$  , and x = 12 units. Find y.

Answer : \_\_\_\_\_

Round 1 2 3 4 5 Round 1 2 3 4 5

#23 Trig – Hustle National MAO 2008

In triangle XYZ, <X =  $30^{\circ}$  , <Y =  $45^{\circ}$  , and x = 12 units. Find y.

#23 Trig – Hustle National MAΘ 2008

In triangle XYZ, <X =  $30^{\circ}$  , <Y =  $45^{\circ}$  , and x = 12 units. Find y.

Answer : \_\_\_\_\_

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  $\alpha + \beta$ .

# Answer : \_\_\_\_\_

Round 1 2 3 4 5

# #24 Trig – Hustle National MAO 2008

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

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

# Answer : \_\_\_\_\_

Round 1 2 3 4 5

# #24 Trig – Hustle National MAO 2008

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

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  $\alpha + \beta$ .

Answer : \_\_\_\_\_

#25 Trig – Hustle National MA⊕ 2008

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

#25 Trig – Hustle National MA© 2008

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

Answer : \_\_\_\_\_

Round 1 2 3 4 5

Answer : \_\_\_\_\_

Round 1 2 3 4 5

#25 Trig – Hustle National MA⊕ 2008

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

#25 Trig – Hustle National MAO 2008

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

Answer : \_\_\_\_\_

Round 1 2 3 4 5

Answer : \_\_\_\_\_