#1 Precalculus – Hustle MA® National Convention 2019

Find the Cartesian ordered pair that is equivalent

to the polar ordered pair $\left(4, \frac{2\pi}{3}\right)$.

#1 Precalculus - Hustle MAO National Convention 2019

Find the Cartesian ordered pair that is equivalent

to the polar ordered pair $\left(4, \frac{2\pi}{3}\right)$.



Answer : _____

Round 1 2 3 4 5

Answer : _____

Round 1 2 3 4 5

#1 Precalculus - Hustle MA® National Convention 2019

Find the Cartesian ordered pair that is equivalent

to the polar ordered pair $\left(4, \frac{2\pi}{3}\right)$.

#1 Precalculus - Hustle MAO National Convention 2019

Find the Cartesian ordered pair that is equivalent

to the polar ordered pair $\left(4, \frac{2\pi}{3}\right)$.

Answer : _____

Round 1 2 3 4 5

Answer : _____

#2 Precalculus – Hustle MA© National Convention 2019

Find the sum of the squares of the solutions to the equation $x^3 + 3x^2 - 2x - 7 = 0$.

#2 Precalculus – Hustle MA© National Convention 2019

Find the sum of the squares of the solutions to the equation $x^3 + 3x^2 - 2x - 7 = 0$.

Answer : _____

Round 1 2 3 4 5

Answer : _____

Round 1 2 3 4 5

#2 Precalculus – Hustle MA© National Convention 2019

Find the sum of the squares of the solutions to the equation $x^3 + 3x^2 - 2x - 7 = 0$.

#2 Precalculus – Hustle MA© National Convention 2019

Find the sum of the squares of the solutions to the equation $x^3 + 3x^2 - 2x - 7 = 0$.

Answer : _____

Round 1 2 3 4 5

Answer : _____

#3 Precalculus – Hustle MAO National Convention 2019

Given the set of all real numbers and the set of all 2×2 matrices with real entries, write the numbers of the properties below that apply to one set but not the other:

- 1) commutative property of addition
- 2) commutative property of multiplication
- 3) associative property of addition
- 4) associative property of multiplication

#3 Precalculus – Hustle MA_O National Convention 2019

Given the set of all real numbers and the set of all 2×2 matrices with real entries, write the numbers of the properties below that apply to one set but not the other:

- 1) commutative property of addition
- 2) commutative property of multiplication
- 3) associative property of addition
- 4) associative property of multiplication

:	
	:

Round 1 2 3 4 5

Answer : _____

Round 1 2 3 4 5

#3 Precalculus - Hustle MAO National Convention 2019

Given the set of all real numbers and the set of all 2×2 matrices with real entries, write the numbers of the properties below that apply to one set but not the other:

- 1) commutative property of addition
- 2) commutative property of multiplication
- 3) associative property of addition

Answer:

4) associative property of multiplication

#3 Precalculus - Hustle MAO National Convention 2019

Given the set of all real numbers and the set of all 2×2 matrices with real entries, write the numbers of the properties below that apply to one set but not the other:

- 1) commutative property of addition
- 2) commutative property of multiplication
- 3) associative property of addition
- 4) associative property of multiplication

Answer :																																						1	A	ľ	1	S	M	76	e	•		 			 		 			
Round	1	2	3	4	5]	R	()	u	n	ıd	l		1	1	2	3		4		5	

#4 Precalculus – Hustle MA© National Convention 2019

If
$$f(x) = \frac{2x-1}{x-2}$$
 and $g(x) = \frac{3x+1}{x+2}$, then the

domain of the composite function $(f \circ g)(x)$ consists of all real numbers except which one(s)?

#4 Precalculus – Hustle MA© National Convention 2019

If $f(x) = \frac{2x-1}{x-2}$ and $g(x) = \frac{3x+1}{x+2}$, then the domain of the composite function $(f \circ g)(x)$ consists of all real numbers except which one(s)?

Answer : _____

Round 1 2 3 4 5

Answer : _____

Round 1 2 3 4 5

#4 Precalculus – Hustle MA® National Convention 2019

If $f(x) = \frac{2x-1}{x-2}$ and $g(x) = \frac{3x+1}{x+2}$, then the domain of the composite function $(f \circ g)(x)$

consists of all real numbers except which one(s)?

#4 Precalculus – Hustle MA© National Convention 2019

If $f(x) = \frac{2x-1}{x-2}$ and $g(x) = \frac{3x+1}{x+2}$, then the domain of the composite function $(f \circ g)(x)$ consists of all real numbers except which one(s)?

Answer	•	
--------	---	--

Answer : _____

Round 1 2 3 4 5

#5 Precalculus – Hustle MA© National Convention 2019

Find the sum of the infinite series: $\sum_{i=1}^{\infty} \frac{3i+1}{2^{i}}$

Find the sum of the infinite series: $\sum_{i=1}^{\infty} \frac{3i+1}{2^{i}}$

Answer : _____

Round 1 2 3 4 5

Answer : _____

Round 1 2 3 4 5

#5 Precalculus – Hustle
MA _O National Convention 2019

Find the sum of the infinite series: $\sum_{i=1}^{\infty} \frac{3i+1}{2^{i}}$

#5 Precalculus – Hustle MA© National Convention 2019

Find the sum of the infinite series: $\sum_{i=1}^{\infty} \frac{3i+1}{2^{i}}$

Answer : _____

Round 1 2 3 4 5

Answer : _____

#6 Precalculus – Hustle MA© National Convention 2019

Find the coefficient of the 7th term in the expansion of $(2x+3)^9$ when like terms have been combined and powers of x have been written in descending order.

#6 Precalculus – Hustle MA© National Convention 2019

Find the coefficient of the 7th term in the expansion of $(2x+3)^9$ when like terms have been combined and powers of x have been written in descending order.

Answer	:	
--------	---	--

Round 1 2 3 4 5

Answer : _____

Round 1 2 3 4 5

#6 Precalculus – Hustle MA© National Convention 2019

Find the coefficient of the 7th term in the expansion of $(2x+3)^9$ when like terms have been combined and powers of x have been written in descending order.

#6 Precalculus – Hustle MA© National Convention 2019

Find the coefficient of the 7th term in the expansion of $(2x+3)^9$ when like terms have been combined and powers of x have been written in descending order.

Answer :	
----------	--

Round 1 2 3 4 5

Answer : _____

#7 Precalculus – Hustle MA© National Convention 2019

Write in rectangular form, where $i = \sqrt{-1}$:

$$\left(\frac{\sqrt{3}}{2}+\frac{1}{2}i\right)^{2019}$$

#7 Precalculus – Hustle MA© National Convention 2019

Write in rectangular form, where $i = \sqrt{-1}$:

$$\left(\frac{\sqrt{3}}{2}+\frac{1}{2}i\right)^{2019}$$

Answer : _____

Round 1 2 3 4 5

Answer : _____

Round 1 2 3 4 5

#7 Precalculus – Hustle MA© National Convention 2019

Write in rectangular form, where $i = \sqrt{-1}$:

$$\left(\frac{\sqrt{3}}{2} + \frac{1}{2}i\right)^{2019}$$

#7 Precalculus – Hustle MA© National Convention 2019

Write in rectangular form, where $i = \sqrt{-1}$:

$$\left(\frac{\sqrt{3}}{2} + \frac{1}{2}i\right)^{2019}$$

Answer : _____

Answer : _____

Round 1 2 3 4 5

#8 Precalculus – Hustle MA© National Convention 2019

If $f(x) = x^3 + 9x^2 + 27x + 19$, find the value of $f^{-1}(-16)$.

#8 Precalculus – Hustle MA© National Convention 2019

If $f(x) = x^3 + 9x^2 + 27x + 19$, find the value of $f^{-1}(-16)$.

Answer : _____

Round 1 2 3 4 5

Answer : _____

Round 1 2 3 4 5

#8 Precalculus – Hustle MA© National Convention 2019

If $f(x) = x^3 + 9x^2 + 27x + 19$, find the value of $f^{-1}(-16)$.

#8 Precalculus – Hustle MA© National Convention 2019

If $f(x) = x^3 + 9x^2 + 27x + 19$, find the value of $f^{-1}(-16)$.

Answer : _____

Round 1 2 3 4 5

Answer : _____

#9 Precalculus – Hustle MA© National Convention 2019

Find the equation of the non-vertical asymptote

of the function with equation $y = \frac{2x^4 + x - 3}{x^2 - 3}$.

#9 Precalculus – Hustle MA© National Convention 2019

Find the equation of the non-vertical asymptote

of the function with equation $y = \frac{2x^4 + x - 3}{x^2 - 3}$.

Answer : _____

Round 1 2 3 4 5

#9 Precalculus – Hustle MA© National Convention 2019

Find the equation of the non-vertical asymptote of the function with equation $y = \frac{2x^4 + x - 3}{x^2 - 3}$.

Answer : _____

Round 1 2 3 4 5

#9 Precalculus – Hustle MA© National Convention 2019

Find the equation of the non-vertical asymptote of the function with equation $y = \frac{2x^4 + x - 3}{x^2 - 3}$.

Answer : _____

Round 1 2 3 4 5

Answer : _____

#10 Precalculus – Hustle MA© National Convention 2019

Find the *x*-coordinate of the point where the

graph of $y = \frac{2x^4 + x - 3}{x^2 - 3}$ intersects its non-

vertical asymptote.

#10 Precalculus – Hustle MA© National Convention 2019

Find the *x*-coordinate of the point where the

graph of $y = \frac{2x^4 + x - 3}{x^2 - 3}$ intersects its non-

vertical asymptote.

Answer	:	
--------	---	--

Round 1 2 3 4 5

Round 1 2 3 4 5

Answer : _____

#10 Precalculus – Hustle MA© National Convention 2019

Find the *x*-coordinate of the point where the

graph of $y = \frac{2x^4 + x - 3}{x^2 - 3}$ intersects its non-

vertical asymptote.

#10 Precalculus – Hustle MA© National Convention 2019

Find the x-coordinate of the point where the graph of $y = \frac{2x^4 + x - 3}{x^2 - 3}$ intersects its non-

vertical asymptote.

Answer : _____

Round 1 2 3 4 5

Answer : _____

#11 Precalculus – Hustle MA© National Convention 2019

If $\vec{u} = \langle 3, -2, 4 \rangle$ and $\vec{v} = \langle -1, 5, 0 \rangle$, find the cross

product $\vec{u} \times \vec{v}$, written in the same format as both \vec{u} and \vec{v} .

#11 Precalculus – Hustle MA© National Convention 2019

If $\vec{u} = \langle 3, -2, 4 \rangle$ and $\vec{v} = \langle -1, 5, 0 \rangle$, find the cross

product $\vec{u} \times \vec{v}$, written in the same format as both \vec{u} and \vec{v} .

Answer	:	
--------	---	--

Round 1 2 3 4 5

Round 1 2 3 4 5

Answer : _____

#11 Precalculus – Hustle MA© National Convention 2019

If $\vec{u} = \langle 3, -2, 4 \rangle$ and $\vec{v} = \langle -1, 5, 0 \rangle$, find the cross

product $\vec{u} \times \vec{v}$, written in the same format as both \vec{u} and \vec{v} .

#11 Precalculus – Hustle MA© National Convention 2019

If $\vec{u} = \langle 3, -2, 4 \rangle$ and $\vec{v} = \langle -1, 5, 0 \rangle$, find the cross product $\vec{u} \times \vec{v}$, written in the same format as both \vec{u} and \vec{v} .

Round 1 2 3 4 5

Answer : _____

#12 Precalculus – Hustle MA© National Convention 2019

Find the eccentricity of the conic section whose

polar equation is $r = \frac{2}{3 + 2\sin\theta}$.

#12 Precalculus – Hustle MA© National Convention 2019

Find the eccentricity of the conic section whose

polar equation is $r = \frac{2}{3 + 2\sin\theta}$.

Answer : _____

Round 1 2 3 4 5

Answer : _____

Round 1 2 3 4 5

#12 Precalculus – Hustle MA© National Convention 2019

Find the eccentricity of the conic section whose polar equation is $r = \frac{2}{3+2\sin\theta}$.

#12 Precalculus – Hustle MA© National Convention 2019

Find the eccentricity of the conic section whose polar equation is $r = \frac{2}{3+2\sin\theta}$.

Answer : _____

Round 1 2 3 4 5

Answer : _____

#13 Precalculus – Hustle MA© National Convention 2019

Find the standard deviation of the data set $\{-4, -2, 0, 1, 5\}$, where this set represents the population of an experiment.

#13 Precalculus – Hustle MA© National Convention 2019

Find the standard deviation of the data set $\{-4, -2, 0, 1, 5\}$, where this set represents the population of an experiment.

Answer	:	
--------	---	--

Round 1 2 3 4 5

Answer : _____

Round 1 2 3 4 5

#13 Precalculus – Hustle MA© National Convention 2019

Find the standard deviation of the data set $\{-4, -2, 0, 1, 5\}$, where this set represents the population of an experiment.

#13 Precalculus – Hustle MA© National Convention 2019

Find the standard deviation of the data set $\{-4, -2, 0, 1, 5\}$, where this set represents the population of an experiment.

Answer : _____

Round 1 2 3 4 5

Answer : _____

#14 Precalculus – Hustle MA© National Convention 2019

Find the complex solution to the equation $x^4 = -8 + 8\sqrt{3}i$ that lies in the third quadrant of the Argand plane. Write the solution in a + biform, where a and b are real numbers. Throughout this problem, $i = \sqrt{-1}$.

#14 Precalculus – Hustle MA© National Convention 2019

Find the complex solution to the equation $x^4 = -8 + 8\sqrt{3}i$ that lies in the third quadrant of the Argand plane. Write the solution in a + biform, where a and b are real numbers. Throughout this problem, $i = \sqrt{-1}$.

Answer	:	
--------	---	--

Round 1 2 3 4 5

Answer : _____

Round 1 2 3 4 5

#14 Precalculus – Hustle MA© National Convention 2019

Find the complex solution to the equation $x^4 = -8 + 8\sqrt{3}i$ that lies in the third quadrant of the Argand plane. Write the solution in a + biform, where a and b are real numbers. Throughout this problem, $i = \sqrt{-1}$.

#14 Precalculus – Hustle MA© National Convention 2019

Find the complex solution to the equation $x^4 = -8 + 8\sqrt{3}i$ that lies in the third quadrant of the Argand plane. Write the solution in a + biform, where a and b are real numbers. Throughout this problem, $i = \sqrt{-1}$.

Answer :										ł	Ans	we	r:					 		
		-	-		_							-	_				-	_		_
Round	1	2	3	4	5								Rot	ınd		1	2	3	4	 5

#15 Precalculus – Hustle MA® National Convention 2019

Evaluate: $\lim_{x \to \infty} \frac{1 - 4x}{2x}$

#15 Precalculus – Hustle MA© National Convention 2019

Evaluate: $\lim_{x\to\infty} \frac{1-4x}{2x}$

Answer : _____

Round 1 2 3 4 5

Answer : _____

Round 1 2 3 4 5

#15 Precalculus – Hustle MA© National Convention 2019

Evaluate: $\lim_{x\to\infty} \frac{1-4x}{2x}$

#15 Precalculus – Hustle MA© National Convention 2019

Evaluate: $\lim_{x\to\infty} \frac{1-4x}{2x}$

Answer : _____

Round 1 2 3 4 5

Answer : _____

#16 Precalculus – Hustle MA© National Convention 2019

Find the point, written in the form (x, y), where the graph of $y = \frac{x^3 + 6x^2 + 3x - 10}{5x^2 + 5x}$ intersects its non-vertical asymptote. #16 Precalculus – Hustle MA® National Convention 2019

Find the point, written in the form (x, y), where the graph of $y = \frac{x^3 + 6x^2 + 3x - 10}{5x^2 + 5x}$ intersects its non-vertical asymptote.

Answer : _____

Round 1 2 3 4 5

Answer : _____

Round 1 2 3 4 5

#16 Precalculus – Hustle MA© National Convention 2019

Find the point, written in the form (x, y), where the graph of $y = \frac{x^3 + 6x^2 + 3x - 10}{5x^2 + 5x}$ intersects its non-vertical asymptote.

#16 Precalculus – Hustle MA© National Convention 2019

Find the point, written in the form (x, y), where the graph of $y = \frac{x^3 + 6x^2 + 3x - 10}{5x^2 + 5x}$ intersects its non-vertical asymptote.

Round 1 2 3 4 5

Answer : _____

#17 Precalculus – Hustle MA© National Convention 2019

The polynomial $g(x) = x^5 + 2x^3 + 5x + 11$ has only

one real zero. Between which two consecutive integers does this zero lie?

#17 Precalculus – Hustle MA© National Convention 2019

The polynomial $g(x) = x^5 + 2x^3 + 5x + 11$ has only

one real zero. Between which two consecutive integers does this zero lie?

Answer :	
----------	--

Round 1 2 3 4 5

Answer : _____

Round 1 2 3 4 5

#17 Precalculus – Hustle MA© National Convention 2019

The polynomial $g(x) = x^5 + 2x^3 + 5x + 11$ has only

one real zero. Between which two consecutive integers does this zero lie?

#17 Precalculus – Hustle MA® National Convention 2019

The polynomial $g(x) = x^5 + 2x^3 + 5x + 11$ has only one real zero. Between which two consecutive integers does this zero lie?

:	
	:

Round 1 2 3 4 5

Answer : _____

#18 Precalculus – Hustle MA© National Convention 2019

Find the sum of the solutions to the equation:

 $\log_{(x+1)}(3x+7) = 2$

#18 Precalculus – Hustle MA© National Convention 2019

Find the sum of the solutions to the equation:

 $\log_{(x+1)}(3x+7)=2$

Answer : _____

Round 1 2 3 4 5

Answer : _____

Round 1 2 3 4 5

#18 Precalculus – Hustle MA© National Convention 2019

Find the sum of the solutions to the equation: $log_{(x+1)}(3x+7)=2$ #18 Precalculus – Hustle MA© National Convention 2019

Find the sum of the solutions to the equation: $\log_{(x+1)}(3x+7) = 2$

Answer : _____

Round 1 2 3 4 5

Answer : _____

#19 Precalculus – Hustle MA© National Convention 2019

Find the sum of the arithmetic series whose first term is -7, whose last term is 161, and whose common difference is 3.

#19 Precalculus – Hustle MA© National Convention 2019

Find the sum of the arithmetic series whose first term is -7, whose last term is 161, and whose common difference is 3.

Answer	·
--------	---

Round 1 2 3 4 5

Answer : _____

Round 1 2 3 4 5

#19 Precalculus – Hustle MA© National Convention 2019

Find the sum of the arithmetic series whose first term is -7, whose last term is 161, and whose common difference is 3.

#19 Precalculus – Hustle MA© National Convention 2019

Find the sum of the arithmetic series whose first term is -7, whose last term is 161, and whose common difference is 3.

Answer : _____

Round 1 2 3 4 5

Answer : _____

#20 Precalculus – Hustle MA© National Convention 2019

Find the domain of the function $f(x) = \sqrt{\frac{3x-6}{x-7}}$, written in interval notation.

#20 Precalculus – Hustle MA© National Convention 2019

Find the domain of the function $f(x) = \sqrt{\frac{3x-6}{x-7}}$, written in interval notation.

Answer : _____

Round 1 2 3 4 5

Answer : _____

Round 1 2 3 4 5

#20 Precalculus – Hustle MA© National Convention 2019

Find the domain of the function $f(x) = \sqrt{\frac{3x-6}{x-7}}$, written in interval notation.

#20 Precalculus – Hustle MA© National Convention 2019

Find the domain of the function $f(x) = \sqrt{\frac{3x-6}{x-7}}$, written in interval notation.

Answer : _____

Round 1 2 3 4 5

Answer : _____

#21 Precalculus – Hustle MA© National Convention 2019

Find the probability, written as a reduced fraction, of drawing two cards of the same color or two cards of the same rank when drawing two cards from a standard deck of 52 playing cards.

#21 Precalculus – Hustle MA© National Convention 2019

Find the probability, written as a reduced fraction, of drawing two cards of the same color or two cards of the same rank when drawing two cards from a standard deck of 52 playing cards.

Answer	:	
--------	---	--

Round 1 2 3 4 5

Answer : _____

Round 1 2 3 4 5

#21 Precalculus – Hustle MA© National Convention 2019

Find the probability, written as a reduced fraction, of drawing two cards of the same color or two cards of the same rank when drawing two cards from a standard deck of 52 playing cards.

#21 Precalculus – Hustle MA© National Convention 2019

Find the probability, written as a reduced fraction, of drawing two cards of the same color or two cards of the same rank when drawing two cards from a standard deck of 52 playing cards.

Answer : _____

Round 1 2 3 4 5

Answer : _____

#22 Precalculus – Hustle MA© National Convention 2019

Find the sum of all solutions to the equation $2\sin^2\theta - \sin\theta - 1 = 0$, where $0 \le \theta < 2\pi$.

#22 Precalculus – Hustle MA© National Convention 2019

Find the sum of all solutions to the equation $2\sin^2\theta - \sin\theta - 1 = 0$, where $0 \le \theta < 2\pi$.

Answer : _____

Round 1 2 3 4 5

#22 Precalculus – Hustle MA© National Convention 2019

Find the sum of all solutions to the equation $2\sin^2\theta - \sin\theta - 1 = 0$, where $0 \le \theta < 2\pi$. Answer : _____

Round 1 2 3 4 5

#22 Precalculus – Hustle MA© National Convention 2019

Find the sum of all solutions to the equation $2\sin^2\theta - \sin\theta - 1 = 0$, where $0 \le \theta < 2\pi$.

Answer : _____

Round 1 2 3 4 5

Answer : _____

#23 Precalculus – Hustle MA© National Convention 2019

Evaluate: $\langle 2, -4, 9 \rangle \cdot \langle 3, 15, -8 \rangle$

#23 Precalculus – Hustle MA© National Convention 2019

Evaluate: $\langle 2, -4, 9 \rangle \cdot \langle 3, 15, -8 \rangle$

Answer : _____

Round 1 2 3 4 5

Answer : _____

Round 1 2 3 4 5

#23 Precalculus – Hustle MA© National Convention 2019

Evaluate: $\langle 2, -4, 9 \rangle \cdot \langle 3, 15, -8 \rangle$

#23 Precalculus – Hustle MA© National Convention 2019

Evaluate: $\langle 2, -4, 9 \rangle \cdot \langle 3, 15, -8 \rangle$

Answer : _____

Round 1 2 3 4 5

Answer : _____

#24 Precalculus – Hustle MA© National Convention 2019

The points (16, -13) and (-22, -32) both lie on the line with equation x + Ay = B, where A and B are real numbers. Find the value of B.

#24 Precalculus – Hustle MA© National Convention 2019

The points (16, -13) and (-22, -32) both lie on the line with equation x + Ay = B, where A and B are real numbers. Find the value of B.

Answer	:	
--------	---	--

Round 1 2 3 4 5

Answer : _____

Round 1 2 3 4 5

#24 Precalculus – Hustle MA© National Convention 2019

The points (16, -13) and (-22, -32) both lie on the line with equation x + Ay = B, where A and B are real numbers. Find the value of B.

#24 Precalculus – Hustle MA© National Convention 2019

The points (16, -13) and (-22, -32) both lie on the line with equation x + Ay = B, where A and B are real numbers. Find the value of B.

Answer : _____

Round 1 2 3 4 5

Answer : _____

#25 Precalculus – Hustle MA© National Convention 2019

An infinite geometric series consisting only of real terms has first term 6 and fifth term $\frac{3}{8}$. Find the sum of all possible sums of this series.

#25 Precalculus – Hustle MA© National Convention 2019

An infinite geometric series consisting only of real terms has first term 6 and fifth term $\frac{3}{8}$. Find the sum of all possible sums of this series.

Answer	:	
--------	---	--

Round 1 2 3 4 5

Answer : _____

Round 1 2 3 4 5

#25 Precalculus – Hustle MA© National Convention 2019

An infinite geometric series consisting only of real terms has first term 6 and fifth term $\frac{3}{8}$. Find the sum of all possible sums of this series.

#25 Precalculus – Hustle MA© National Convention 2019

An infinite geometric series consisting only of real terms has first term 6 and fifth term $\frac{3}{8}$. Find the sum of all possible sums of this series.

Answer : _____

Round 1 2 3 4 5

Answer : _____