#1 Algebra – Hustle MA© National Convention 2016

Let x + y = 11 and $x^2 + y^2 = 325$. What is the value of $x^3 + y^3$?

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Answer : _____

Round 1 2 3 4 5

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#2 Algebra – Hustle MA© National Convention 2016

The sum of two numbers is 20, and the product of the two numbers is -15. Find the sum of the reciprocals of the two numbers.

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Round 1 2 3 4 5

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Round 1 2 3 4 5

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Answer : _____

Round 1 2 3 4 5

Answer : _____

#3 Algebra – Hustle MA© National Convention 2016

Find the distance between the foci of the conic section whose graph has equation $4x^2 + 9y^2 + 24x + 72y + 144 = 0.$

#3 Algebra – Hustle MA© National Convention 2016

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Answer : _____

Round 1 2 3 4 5

Answer : _____

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Answer : _____

Round 1 2 3 4 5

Answer : _____

#4 Algebra – Hustle MA© National Convention 2016

In how many ways can eight MAO people line up for a photograph if two of those people, Kay and Thom, are side by side?

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Answer ·	
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Round 1 2 3 4 5

Answer : _____

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Answer : _____

Round 1 2 3 4 5

Answer : _____

#5 Algebra – Hustle MA© National Convention 2016

For what value of *c* will $2x^3 - 5x^2 + cx + 6$ leave a remainder of 98 when divided by x - 4?

#5 Algebra – Hustle MA© National Convention 2016

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Answer -			
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Round 1 2 3 4 5

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Round 1 2 3 4 5

Answer : _____

#6 Algebra – Hustle MA© National Convention 2016

A quadratic polynomial p(x) has relatively prime integral coefficients, and the roots of

$$p(x)$$
 are $2 \pm \frac{i\sqrt{3}}{2}$. Find $p(x)$.

#6 Algebra – Hustle MA© National Convention 2016

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Answer : _____

Round 1 2 3 4 5

Answer : _____

#7 Algebra – Hustle MA⊖ National Convention 2016

Solve for *m*: $\sqrt{25 \cdot \sqrt[3]{5}} \cdot \sqrt[3]{5 \cdot \sqrt[4]{25}} = 5^m$

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Answer : _____

Round 1 2 3 4 5

Answer : _____

#8 Algebra – Hustle MA© National Convention 2016

What is the sixth term in the expansion of

 $\left(\frac{x}{2}-\frac{2}{x}\right)^8$, where terms in the expansion are

written in descending order by the exponent of *x*?

#8 Algebra – Hustle MA© National Convention 2016

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Answer	:	
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Round 1 2 3 4 5

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Answer	÷	

Answer : _____

Round 1 2 3 4 5

#9 Algebra – Hustle MA© National Convention 2016

What is the least solution of the equation

 $\begin{vmatrix} -2 & -1 & x \\ x & 1 & 0 \end{vmatrix} = 2?$

-1 3 2

#9 Algebra – Hustle MA© National Convention 2016

What is the least solution of the equation

 $\begin{vmatrix} -2 & -1 & x \\ x & 1 & 0 \\ -1 & 3 & 2 \end{vmatrix} = 2?$

Answer :	
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Round 1 2 3 4 5

Answer : _____

Round 1 2 3 4 5

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What is the least solution of the equation

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x & 1 & 0 \\
-1 & 3 & 2
\end{vmatrix} = 2?$

:	
	:

Answer : _____

Round 1 2 3 4 5

#10 Algebra – Hustle MA© National Convention 2016

Three Mu Alpha Theta sponsors who are no longer teenagers observe that the product of their ages is 26,390. What is the sum of their ages?

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Answer : _____

Round 1 2 3 4 5

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Round 1 2 3 4 5

Answer : _____

#11 Algebra – Hustle MA© National Convention 2016

The roots of $P(x) = x^3 + Ax^2 - 2Ax - 8$ are

integral and form an increasing arithmetic progression. Find the value of *A*.

#11 Algebra – Hustle MA© National Convention 2016

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Answer :	
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Round 1 2 3 4 5

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Answer : _____

Round 1 2 3 4 5

Answer : _____

#12 Algebra – Hustle MA© National Convention 2016

If two cards are randomly selected without replacement from a standard deck of 52 cards, what is the probability that they are both clubs or both face cards?

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Round 1 2 3 4 5

Answer : _____

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If two cards are randomly selected without replacement from a standard deck of 52 cards, what is the probability that they are both clubs or both face cards?

Round 1 2 3 4 5

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#13 Algebra – Hustle MA© National Convention 2016

If *n*! ends in exactly six consecutive zeros, and if *n* is prime, then what is the value of *n*?

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Round 1 2 3 4 5

Answer : _____

Round 1 2 3 4 5

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Round 1 2 3 4 5

Answer : _____

#14 Algebra – Hustle MA© National Convention 2016

Written in the form a + bi, where a and b are real and $i = \sqrt{-1}$, what is the reciprocal of 2-7i?

#14 Algebra – Hustle MA© National Convention 2016

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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

Answer : _____

#15 Algebra – Hustle MA© National Convention 2016

Find all integral solutions to the inequality $2 < |3x+1| \le 7$.

#15 Algebra – Hustle MA© National Convention 2016

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Answer : _____

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Answer : _____

Round 1 2 3 4 5

Answer : _____

#16 Algebra – Hustle MA© National Convention 2016

A finite arithmetic series has sum -120. The first term of the series is 13 while the common difference of the series is -3. How many terms are in the series?

#16 Algebra – Hustle MA© National Convention 2016

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Round 1 2 3 4 5

Answer : _____

Round 1 2 3 4 5

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Round 1 2 3 4 5

Answer : _____

#17 Algebra – Hustle MA© National Convention 2016

Find the solution to the inequality $|x^2 - 12x + 18| < 18$, written in interval notation.

#17 Algebra – Hustle MA© National Convention 2016

Find the solution to the inequality $|x^2 - 12x + 18| < 18$, written in interval notation.

Answer : _____

Round 1 2 3 4 5

Answer : _____

Round 1 2 3 4 5

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Round 1 2 3 4 5

Answer : _____

#18 Algebra – Hustle MA© National Convention 2016

Write as a fraction in lowest terms: $0.13\overline{8}$

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Round 1 2 3 4 5

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Round 1 2 3 4 5

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Write as a fraction in lowest terms: $0.13\overline{8}$

Answer : _____

Round 1 2 3 4 5

Answer : _____

#19 Algebra – Hustle MA© National Convention 2016

Find all ordered pairs of real numbers (x, y)that are solutions of the system $\begin{cases} x^2 + y^2 + 2y = 10 \\ x^2 + 4y = 7 \end{cases}$

#19 Algebra – Hustle MA© National Convention 2016

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Round 1 2 3 4 5

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#19 Algebra – Hustle MA© National Convention 2016

Find all ordered pairs of real numbers (x, y)that are solutions of the system $\int x^2 + y^2 + 2y = 10$

$$\begin{cases} x + y + 2y = 10 \\ x^2 + 4y = 7 \end{cases}$$

Answer : _____

Round 1 2 3 4 5

Answer : _____

#20 Algebra – Hustle MA© National Convention 2016

Sol	ve f	or ma	trix X:		
[-7	7 2	2	-23	-18	-11]
3	1		8	17	1

#20 Algebra – Hustle MA© National Convention 2016

Solve	e for r	natrix X:		
[-7	$2]_{V}$		-18	-11]
3	$1 \rfloor^{\Lambda}$	_ 8	17	1

Answer : _____

Round 1 2 3 4 5

Answer : _____

Round 1 2 3 4 5

#20 Algebra – Hustle MA© National Convention 2016

Solve	e for ma	atrix X:		
[−7	2	[-23	-18	-11]
3	$1 \int_{1}^{X} =$	8	17	1

#20 Algebra – Hustle MA© National Convention 2016

Solve	e fo	r ma	trix X:		
[-7	2	$ _{\mathbf{v}}$	-23	-18	-11]
3	1	Λ -	8	17	1

Answer : _____

Answer : _____

Round 1 2 3 4 5

#21 Algebra – Hustle MA© National Convention 2016

If *K* is the least common multiple of all twodigit perfect squares, what is the value of \sqrt{K} ?

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Round 1 2 3 4 5

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Round 1 2 3 4 5

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Answer : _____

Round 1 2 3 4 5

Answer : _____

#22 Algebra – Hustle MA© National Convention 2016

Evaluate w	hen x =	=-13:	
$\left(x^{\frac{2}{3}}-10^{\frac{1}{3}}\right)$	$\left(x^{\frac{4}{3}}+1\right)$	$0^{\frac{1}{3}}x^{\frac{2}{3}} +$	$10^{\frac{2}{3}}$

#22 Algebra – Hustle MA© National Convention 2016

Evaluate when x = -13: $\left(x^{\frac{2}{3}} - 10^{\frac{1}{3}}\right) \left(x^{\frac{4}{3}} + 10^{\frac{1}{3}}x^{\frac{2}{3}} + 10^{\frac{2}{3}}\right)$

Answer : _____

Round 1 2 3 4 5

Answer : _____

Round 1 2 3 4 5

#22 Algebra – Hustle MA© National Convention 2016

Evaluate when
$$x = -13$$
:
 $\left(x^{\frac{2}{3}} - 10^{\frac{1}{3}}\right) \left(x^{\frac{4}{3}} + 10^{\frac{1}{3}}x^{\frac{2}{3}} + 10^{\frac{2}{3}}\right)$

#22 Algebra – Hustle MA© National Convention 2016

Evaluate when
$$x = -13$$
:
 $\left(x^{\frac{2}{3}} - 10^{\frac{1}{3}}\right) \left(x^{\frac{4}{3}} + 10^{\frac{1}{3}}x^{\frac{2}{3}} + 10^{\frac{2}{3}}\right)$

Answer : _____

Answer : _____

Round 1 2 3 4 5

#23 Algebra – Hustle MA© National Convention 2016

What is the exact value of the irrational solution to the equation $5^{x} + \frac{10}{5^{x}} = 7$?

#23 Algebra – Hustle MA© National Convention 2016

What is the exact value of the irrational solution to the equation $5^{x} + \frac{10}{5^{x}} = 7$?

Answer : _____

Round 1 2 3 4 5

Answer : _____

Round 1 2 3 4 5

#23 Algebra – Hustle MA© National Convention 2016

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Answer : _____

Round 1 2 3 4 5

Answer : _____

#24 Algebra – Hustle MA© National Convention 2016

Find the non-zero coordinate of the *y*-intercept of the slant asymptote of $f(x) = \frac{2x^3 - 5x^2 + 7}{x^2 + 3x - 1}$?

#24 Algebra – Hustle MA© National Convention 2016

Find the non-zero coordinate of the *y*-intercept of the slant asymptote of $f(x) = \frac{2x^3 - 5x^2 + 7}{x^2 + 3x - 1}$?

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Round 1 2 3 4 5

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Answer : _____

Round 1 2 3 4 5

Answer : _____

#25 Algebra – Hustle MA© National Convention 2016

Paul can solve 25 word problems in 18 minutes; Rob can solve the same set of problems in 30 minutes. How many minutes would it take them to solve the entire set if they work together independently and simultaneously?

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Answer :	
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Round 1 2 3 4 5

Answer : _____

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Round 1 2 3 4 5

Answer : _____