

#1 Algebra - Hustle
MA \odot National Convention 2011

Find the solution set to the inequality
 $x^2 < 3x + 4$, written in interval notation.

Answer : _____

Round 1 2 3 4 5

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#2 Algebra - Hustle
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Find the value of k such that the point $(3,k)$ is equidistant from the points $(1,2)$ and $(6,7)$.

Answer : _____

Round 1 2 3 4 5

#2 Algebra - Hustle
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Answer : _____

Round 1 2 3 4 5

#3 Algebra - Hustle
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Simplify: $\frac{n(n+1)! - 2n!}{(n+1)! + n!}$

Answer : _____

Round 1 2 3 4 5

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Round 1 2 3 4 5

#4 Algebra - Hustle

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For what values of k does the circle with equation $(x - k)^2 + (y - 2k)^2 = 10$ pass through the point $(1,1)$?

Answer : _____

Round 1 2 3 4 5

#4 Algebra - Hustle

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For what values of k does the circle with equation $(x - k)^2 + (y - 2k)^2 = 10$ pass through the point $(1,1)$?

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Round 1 2 3 4 5

#5 Algebra - Hustle
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For what values of k will the line with equation $kx + 5y = 2k$ be perpendicular to the line with equation $2x - 3y = 1$?

Answer : _____

Round 1 2 3 4 5

#5 Algebra - Hustle
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Answer : _____

Round 1 2 3 4 5

#6 Algebra - Hustle
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Let $f(x) = x^3 + x^2 + 2x - 1$. Simplify the expression $\frac{f(x+h) - f(x)}{h}$, where $h \neq 0$.

Answer : _____

Round 1 2 3 4 5

#6 Algebra - Hustle
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#7 Algebra - Hustle

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The leading car rental company, Heat, charges \$30 per day and 15¢ per mile for a car rental. The second-ranking car rental company, Byrd, charges \$32 per day and 12¢ per mile for a car rental. If you expect to drive x miles per day, for what value of x would it cost the same amount to rent the car from either Heat or Byrd?

Answer : _____

Round 1 2 3 4 5

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#8 Algebra - Hustle
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Find all real roots of the function

$$f(x) = x^4 - 10x^2 + 9.$$

Answer : _____

Round 1 2 3 4 5

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Answer : _____

Round 1 2 3 4 5

#9 Algebra - Hustle
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Solve the equation: ${}_{w+1}C_2 = 9({}_wC_1)$

Answer : _____

Round 1 2 3 4 5

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#10 Algebra - Hustle
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The length of a rectangle is 1 less than three times its width. The perimeter of the rectangle is 46. Find the dimensions of the rectangle.

Answer : _____

Round 1 2 3 4 5

#10 Algebra - Hustle
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Answer : _____

Round 1 2 3 4 5

#11 Algebra - Hustle
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Find the solution set to the inequality
 $|4b - 1| \leq 5$, written in interval notation.

Answer : _____

Round 1 2 3 4 5

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Round 1 2 3 4 5

#12 Algebra - Hustle
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Evaluate the determinant: $\begin{vmatrix} 2 & 3 & 0 \\ 1 & -1 & 2 \\ 5 & 1 & 3 \end{vmatrix}$

Answer : _____

Round 1 2 3 4 5

#12 Algebra - Hustle
MA[©] National Convention 2011

Evaluate the determinant: $\begin{vmatrix} 2 & 3 & 0 \\ 1 & -1 & 2 \\ 5 & 1 & 3 \end{vmatrix}$

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Round 1 2 3 4 5

#12 Algebra - Hustle
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Evaluate the determinant: $\begin{vmatrix} 2 & 3 & 0 \\ 1 & -1 & 2 \\ 5 & 1 & 3 \end{vmatrix}$

Answer : _____

Round 1 2 3 4 5

#12 Algebra - Hustle
MA[©] National Convention 2011

Evaluate the determinant: $\begin{vmatrix} 2 & 3 & 0 \\ 1 & -1 & 2 \\ 5 & 1 & 3 \end{vmatrix}$

Answer : _____

Round 1 2 3 4 5

#13 Algebra - Hustle
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Find the ordered pair solution to the system:

$$\begin{vmatrix} x & y \\ -4 & 3 \end{vmatrix} = -10, \begin{vmatrix} x & 5 \\ y & 1 \end{vmatrix} = -16$$

Answer : _____

Round 1 2 3 4 5

#13 Algebra - Hustle
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Answer : _____

Round 1 2 3 4 5

#14 Algebra - Hustle

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Find the standard form of the parabola that passes through the points $(1,4)$, $(-1,6)$, and $(0,2)$.

Answer : _____

Round 1 2 3 4 5

#14 Algebra - Hustle

MA[©] National Convention 2011

Find the standard form of the parabola that passes through the points $(1,4)$, $(-1,6)$, and $(0,2)$.

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Round 1 2 3 4 5

#14 Algebra - Hustle

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Answer : _____

Round 1 2 3 4 5

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MA[©] National Convention 2011

Find the standard form of the parabola that passes through the points $(1,4)$, $(-1,6)$, and $(0,2)$.

Answer : _____

Round 1 2 3 4 5

#15 Algebra - Hustle
MA@ National Convention 2011

Find the quotient when $x^4 + x^3 - 7x^2 + 13x + 4$ is divided by $x^2 + 4x + 1$.

Answer : _____

Round 1 2 3 4 5

#15 Algebra - Hustle
MA@ National Convention 2011

Find the quotient when $x^4 + x^3 - 7x^2 + 13x + 4$ is divided by $x^2 + 4x + 1$.

Answer : _____

Round 1 2 3 4 5

#15 Algebra - Hustle
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Find the quotient when $x^4 + x^3 - 7x^2 + 13x + 4$ is divided by $x^2 + 4x + 1$.

Answer : _____

Round 1 2 3 4 5

#16 Algebra - Hustle
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Joe had 14 liters of a 30% acid solution. How many liters of pure acid must be added to make a solution that is 80% acid?

Answer : _____

Round 1 2 3 4 5

#16 Algebra - Hustle
MA[©] National Convention 2011

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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

#17 Algebra - Hustle
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Factor the expression:

$$(x-3)^2 - 2(x-3)(y+2) - 35(y+2)^2$$

Answer : _____

Round 1 2 3 4 5

#17 Algebra - Hustle
MA@ National Convention 2011

Factor the expression:

$$(x-3)^2 - 2(x-3)(y+2) - 35(y+2)^2$$

Answer : _____

Round 1 2 3 4 5

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Answer : _____

Round 1 2 3 4 5

#18 Algebra - Hustle
MA@ National Convention 2011

Solve the equation: $2^{y-1} = 2^y - 1$

Answer : _____

Round 1 2 3 4 5

#18 Algebra - Hustle
MA@ National Convention 2011

Solve the equation: $2^{y-1} = 2^y - 1$

Answer : _____

Round 1 2 3 4 5

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Round 1 2 3 4 5

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Solve the equation: $2^{y-1} = 2^y - 1$

Answer : _____

Round 1 2 3 4 5

#19 Algebra - Hustle
MA@ National Convention 2011

If $f(x) = 3x + 4$, what values of x satisfy the equation $f(f(x)) = f(x)$?

Answer : _____

Round 1 2 3 4 5

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Answer : _____

Round 1 2 3 4 5

#20 Algebra - Hustle
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Write the fraction in lowest terms with a rationalized denominator: $\frac{1}{\sqrt{2} + \sqrt{3} + 1}$

Answer : _____

Round 1 2 3 4 5

#20 Algebra - Hustle
MA \odot National Convention 2011

Write the fraction in lowest terms with a rationalized denominator: $\frac{1}{\sqrt{2} + \sqrt{3} + 1}$

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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 the fraction in lowest terms with a rationalized denominator: $\frac{1}{\sqrt{2} + \sqrt{3} + 1}$

Answer : _____

Round 1 2 3 4 5

#21 Algebra - Hustle
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Solve the equation for real values of x :

$$(x-5)^2 - 4|x-5| - 12 = 0$$

Answer : _____

Round 1 2 3 4 5

#21 Algebra - Hustle
MA@ National Convention 2011

Solve the equation for real values of x :

$$(x-5)^2 - 4|x-5| - 12 = 0$$

Answer : _____

Round 1 2 3 4 5

#21 Algebra - Hustle
MA@ National Convention 2011

Solve the equation for real values of x :

$$(x-5)^2 - 4|x-5| - 12 = 0$$

Answer : _____

Round 1 2 3 4 5

#21 Algebra - Hustle
MA@ National Convention 2011

Solve the equation for real values of x :

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Answer : _____

Round 1 2 3 4 5

#22 Algebra - Hustle
MA[©] National Convention 2011

A rectangle has width 6 and length 12. If both dimensions are increased by the same amount, the area enclosed by the rectangle is tripled. What is that amount?

Answer : _____

Round 1 2 3 4 5

#22 Algebra - Hustle
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Answer : _____

Round 1 2 3 4 5

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Answer : _____

Round 1 2 3 4 5

#22 Algebra - Hustle
MA[©] National Convention 2011

A rectangle has width 6 and length 12. If both dimensions are increased by the same amount, the area enclosed by the rectangle is tripled. What is that amount?

Answer : _____

Round 1 2 3 4 5

#23 Algebra - Hustle

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Find the area enclosed by the ellipse with equation $3x^2 + 4y^2 + 18x - 32y - 5 = 0$.

Answer : _____

Round 1 2 3 4 5

#23 Algebra - Hustle

MA@ National Convention 2011

Find the area enclosed by the ellipse with equation $3x^2 + 4y^2 + 18x - 32y - 5 = 0$.

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Round 1 2 3 4 5

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Round 1 2 3 4 5

#23 Algebra - Hustle

MA@ National Convention 2011

Find the area enclosed by the ellipse with equation $3x^2 + 4y^2 + 18x - 32y - 5 = 0$.

Answer : _____

Round 1 2 3 4 5

#24 Algebra - Hustle
MA@ National Convention 2011

Find the solutions of the system:

$$\begin{cases} x^2 + 4y^2 = 16 \\ x + 2y = -4 \end{cases}$$

Answer : _____

Round 1 2 3 4 5

#24 Algebra - Hustle
MA@ National Convention 2011

Find the solutions of the system:

$$\begin{cases} x^2 + 4y^2 = 16 \\ x + 2y = -4 \end{cases}$$

Answer : _____

Round 1 2 3 4 5

#24 Algebra - Hustle
MA@ National Convention 2011

Find the solutions of the system:

$$\begin{cases} x^2 + 4y^2 = 16 \\ x + 2y = -4 \end{cases}$$

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Round 1 2 3 4 5

#24 Algebra - Hustle
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Find the solutions of the system:

$$\begin{cases} x^2 + 4y^2 = 16 \\ x + 2y = -4 \end{cases}$$

Answer : _____

Round 1 2 3 4 5

#25 Algebra - Hustle
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Solve the equation: $\log x + 2 = \log(x + 2)$

Answer : _____

Round 1 2 3 4 5

#25 Algebra - Hustle
MA \odot National Convention 2011

Solve the equation: $\log x + 2 = \log(x + 2)$

Answer : _____

Round 1 2 3 4 5

#25 Algebra - Hustle
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Solve the equation: $\log x + 2 = \log(x + 2)$

Answer : _____

Round 1 2 3 4 5

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