#1 Algebra II – Hustle
MAΘ National Convention 2007

Find the sum of the roots of $y = 2x^2 - 4x + 1$.

Answer : _____

Round   1   2   3   4   5

#2 Algebra II – Hustle
MAΘ National Convention 2007

Evaluate $\displaystyle\sum_{x=1}^{10}(x(x+1))$.

Answer : _____

Round   1   2   3   4   5

#3 Algebra II – Hustle
MAΘ National Convention 2007

What is the value of x that satisfies the following equations:

$$v + 2w + 4x + y = 4$$
$$3w + x - 2y + z = 2$$
$$v - w + 3y - z = 2$$

Answer : _____

Round   1   2   3   4   5

#4 Algebra II – Hustle
MAΘ National Convention 2007

Susan can paint a barn in 2 days. Pam can paint a barn in 4 days. If they work together, how many barns can they paint in 40 days?

Answer : _____

Round   1   2   3   4   5

#5 Algebra II – Hustle
MAΘ National Convention 2007

What is the minimum value $|x^2 - 1| + 4$ can attain?

Answer : _____

Round   1   2   3   4   5

#6 Algebra II – Hustle
MAΘ National Convention 2007

Find the sum of all values of x that satisfy
$3\,|\,x-1\,|-|\,x-1\,|+4\,|\,x-1\,|=18$

Answer : _____

Round 1 2 3 4 5

#7 Algebra II – Hustle
MAΘ National Convention 2007

How many elements of the set
$\{41^2 - 17^2,\ 19^4 - 16,\ 18^2 + 22^2,\ 12^3 + 11^3\}$
are prime?

Answer : _____

Round   1   2   3   4   5

#8 Algebra II – Hustle
MA⊖ National Convention 2007

Let $f(x) = 4x + 2$ and $g(x) = 2[f^{-1}(x)] + 4$.
Find $g(g^{-1}(1))$

Answer : _____

Round   1   2   3   4   5

#9 Algebra II – Hustle
MAΘ National Convention 2007

Evaluate $\sqrt{\pi + \sqrt{\pi + \sqrt{\pi + ...}}}$

Answer : _____

Round   1   2   3   4   5

#9 Algebra II – Hustle
MAΘ National Convention 2007

Evaluate $\sqrt{\pi + \sqrt{\pi + \sqrt{\pi + ...}}}$

Answer : _____

Round   1   2   3   4   5

#9 Algebra II – Hustle
MAΘ National Convention 2007

Evaluate $\sqrt{\pi + \sqrt{\pi + \sqrt{\pi + ...}}}$

Answer : _____

Round   1   2   3   4   5

#9 Algebra II – Hustle
MAΘ National Convention 2007

Evaluate $\sqrt{\pi + \sqrt{\pi + \sqrt{\pi + ...}}}$

Answer : _____

Round   1   2   3   4   5

#10 Algebra II – Hustle
MAΘ National Convention 2007

Find probability that the sum of 5 positive
randomly chosen integers is even.

Answer : _____

Round   1   2   3   4   5

#11 Algebra II – Hustle
MAΘ National Convention 2007

What is the smallest integer that is greater than
$\sqrt{(69)(71)}$?

Answer : _____

Round   1   2   3   4   5

#12 Algebra II – Hustle
MAΘ National Convention 2007

$$\sum_{x=0}^{10} \sqrt{x^2 y} = 220. \text{ Find } y.$$

Answer : _____

Round   1   2   3   4   5

#13 Algebra II – Hustle
MAΘ National Convention 2007

Find the distance between $(3,1)$ and $(4,7)$.

Answer : _____

Round   1   2   3   4   5

#14 Algebra II – Hustle
MAΘ National Convention 2007

How many distinct **_rational_** roots does
$y = x^2 - 2\sqrt{2}x + 2$ have?

Answer : _____

Round   1   2   3   4   5

#15 Algebra II – Hustle
MAΘ National Convention 2007

Find the slope of any line that is perpendicular to $y = 2x$.

Answer : _____

Round   1   2   3   4   5

#16 Algebra II – Hustle
MAΘ National Convention 2007

A crazy store owner puts a pair of shoes on sale for 40% off, but realizes this is too much and marks them up 20%. After people stop buying them, he realizes he needs to lower the price another 50%. If the shoes then cost $9, to the nearest dollar, how much did they originally cost?

Answer : _____

Round   1   2   3   4   5

#17 Algebra II – Hustle
MAΘ National Convention 2007

The sum of two numbers is $\sqrt{48}$ and their product is 4. Find the sum of the squares of these numbers.

Answer : _____

Round   1   2   3   4   5

#18 Algebra II – Hustle
MAΘ National Convention 2007

Simplify $(4+2i)^2 - (4-2i)^2$ completely, where
$i = \sqrt{-1}$.

Answer : _____

Round   1   2   3   4   5

#19 Algebra II – Hustle
MAΘ National Convention 2007

Simplify $\dfrac{x^4 y^2 zx}{xyz^4}$ without using negative

exponents, $x, y, z > 0$.

Answer : _____

Round   1   2   3   4   5

#20 Algebra II – Hustle
MAΘ National Convention 2007

Find the point or points of intersection of
$y = 2x + 1$ and $y = -x^2$.

Answer : _____

Round   1   2   3   4   5

#21 Algebra II – Hustle
MAΘ National Convention 2007

A triangle has sides of lengths $x + 2y - 1$, $y + 4$
and $y - x + 4$. Find its perimeter.

Answer : _____

Round   1   2   3   4   5

#22 Algebra II – Hustle
MAΘ National Convention 2007

A rectangle has area 17 and perimeter 18. Find the length of the longer side.

Answer : _____

Round   1   2   3   4   5

#23 Algebra II – Hustle
MAΘ National Convention 2007

Using $\log 2 \approx 0.3$, tell which is larger,
4^{10} or 5^9 ?

Answer : _____

Round   1   2   3   4   5

#24 Algebra II – Hustle
MAΘ National Convention 2007

If 7 mutant egg-laying gophers can lay 14 eggs in 14 minutes, then how many eggs can 91 of these gophers lay in 28 minutes?

Answer : _____

Round   1   2   3   4   5

#25 Algebra II – Hustle
MAΘ National Convention 2007

What is the slope of the line $x + 2y - 1 = 0$?

Answer : _____

Round   1   2   3   4   5