

TMC – 2006 – MATH BOWL

Round 12	Questions	Answers
1.	What is the largest two-digit number that is divisible by both 4 and 6?	96
2.	A fifth degree polynomial function having real coefficients has known zeros $2, i,$ and $4 + 3i$. The other zeros are:	$-i$ and $4 - 3i$
3.	What is the ratio of the area of a square to the perimeter of the square if the square is of side length 5?	$\frac{5}{4}$ or $5 : 4$
4.	A 2 by 2 matrix of ones has determinate equal to?	0
5.	Suppose z varies directly with x and inversely with y . If z is 2 when x is 24 and y is 3, find y when x is 40 and z is 5.	2
6.	Use an inequality to state the domain of $f(x) = \frac{1}{\sqrt{2-x}}$. $2 > x, x < 2,$ or $-\infty < x < 2$	
7.	The quadratic $ax^2 + bx + c$ has how many distinct zeros when the discriminant equals zero?	1
8.	If $ABDC$ is a rhombus, ABD is an equilateral triangle, and diagonal $AD = 4$ then what is the perimeter of the rhombus?	16
9.	What is the maximum value of the function $f(x) = -6 - (x + 6)^2$?	-6
10.	If $a, b, c,$ and d are nonzero constants, then the graph of $y = \frac{ax + b}{cx + d}$, that is, $y =$ the quantity $ax + b$ divided by the quantity $cx + d$ has a horizontal asymptote at:	$y = \frac{a}{c}$

Tie Breakers

1.	If the natural logarithm of the quantity $x - 2$ equals 0, what is x ?	3
2.	How many points with integer coordinates lie strictly inside the circle of radius $\sqrt{5}$ centered at the origin?	13
3.	If a leg of an isosceles right triangle has length 8, what is the area of the triangle?	32