

2007 - 2008 Log1 Contest Round 3
Theta Individual

Name: _____

4 points each		
1	If Bill's favorite number is 3 more than the result of multiplying the number of integers from 10 to 20 by the interior degree measure of a regular convex decagon, what is his favorite number?	
2	If Eric can write a math test in 1 hour and Trevor can write one in two hours, how long in hours will it take them to write 6 math tests if they work together?	
3	A square is inscribed in a circle of diameter 4, what is the area inside the circle but outside the square?	
4	What number is halfway between $\frac{1}{3}$ and $\frac{1}{4}$ on the number line?	
5	What is $\frac{1}{2} + \frac{2}{3} + \frac{3}{5}$? Leave answer as an improper fraction.	

5 points each		
6	If $x+y=4$ and $xy=3$, then what is $3x^2 + 3y^2$?	
7	What the largest base 10 number that can be expressed in 3 digits of base 16?	
8	If $f(x) = x^2 + 3x - 4$, then what is $f(\pi + 1)$?	
9	What is the largest positive difference between 2 roots of the equation $y = 5x^3 + x^2 - 5x - 1$?	
10	Eric's route from his home to school has 5 stoplights, each with a 25% chance of delaying him 2 minutes, and the drive takes him 12 minutes with no stoplights slowing him. Every day he leaves for school 15 minutes before his first period class. What is Eric's expected amount of (average) time between when he arrives at school and when his first class starts?	

6 points each		
11	If the length of a rectangle is increased 30% and the width is decreased 40%, then the area of the new rectangle is what percentage of the original rectangle's area?	
12	How many times do the graphs of $3x - y = -10$ and $y = x^2 + 14x + 50$ intersect?	
13	A 60° sector is cut from a circle with radius 6 and rolled to form a cone. What is the volume of this cone?	
14	Given two positive odd numbers: j and k with $j > k$; what is the largest integer that divides (no remainder) the quantity: $j^2 - k^2$?	
15	An isosceles triangle has a perimeter of 50 and an altitude to the base (between the equal angles) of 5. What is the area of the triangle?	