The Richard Stockton College of New Jersey Mathematical Mayhem 2013

Individual Round

March 23, 2013

Name	9:
High	School:
	Instructions:
	sts of 18 problems worth a total of 80 points, made up of 8 Appetizers worth 3 points worth 5 points each, and 3 Desserts worth 7 points each.
Each of the 18 p	roblems is multiple choice, and each problem comes with 5 possible answers.
For each probler	m, circle the best answer .
You are not requ	ired to show any work this round.
No calculators a	re permitted.
This round is 75	minutes long. Good Luck!

OFFICIAL USE ONLY:

Problem #	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	Total
Points Earned																			

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Problem 15. What is the sum of the digits in the decimal representation of $(10^{10} + 1)^2$?

(A.) 1 (B.) 2 (C.) 4 (D.) 8 (E.) none of these

By looking at small powers of 10, observe the following pattern:

 $(10000000001)^2 = 1(zeros)2(zeros)1.$

~ Desserts ~

Problem 16. Beginning with 1, write all positive integers successively, beginning as 12345678910111213 :::. What digit appears in the 2013th position?

All one and two digit numbers require 189 digits 2013 189 = 1824, and 1824=3 = 608. This is how many tb02e4319/1t2(wr0ble3sC)we in #E604to76957/4oFf & 27080/1429) 52778 (tq) Ahl): 125786 ine) 92857 (e60360428.)-3d)-257(372(digi291.38)