

Lectures on Contest Mathematics

US1 Contest Supplement for AMC8, MathCounts and AMC10

Summer 2011

Zuming Feng
Phillips Exeter Academy and IDEA Math
zfeng@exeter.edu

©Copyright 2008 – 2011 Idea Math

Idea Math
Internal Use

Copyright © 2008-2011 IDEA MATH.

“Cogito ergo Sum” – “I think, therefore I am”

René Descartes (1596-1650)

©Copyright 2008 – 2011 Idea Math

Idea Math
Internal Use

Contents

©Copyright 2008 – 2011 Idea Math

Combinatorics	1
1.1 Basic counting principles (part 1)	1
1.1.1 Addition Principle	1
1.1.2 Multiplication Principle	1
1.2 Basic counting principles (part 2)	3
1.2.1 A touch on number theory	3
1.2.2 Permutations	3
1.3 Basic counting principles (part 3)	4
1.3.1 Combinations	4
1.3.2 Does the order matter?	4
1.4 Basic counting principles (part 4)	6
Number Theory	7
2.1 Multiples of small numbers	7
2.1.1 Rules	7
2.1.2 Examples	7
2.1.3 Exercises	8
2.2 Selected entry level number sense problems from recent ARML	9
2.3 Brain teasers for beginners	10
3 Practice tests	13
3.1 More medium level problems from EMC ² 2010	13
3.2 More medium level problems from EMC ² 2011	15
3.3 Selected medium level problems from AMC 2011	17