

# Lectures on Challenging Mathematics

## Core Computational Mathematics Volume 3.2

### UC3 Counting

Summer 2017

Zuming Feng

Phillips Exeter Academy and IDEA Math  
zfeng@exeter.edu

©Copyright 2008 – 2017 Idea Math

# Contents

©Copyright 2008 – 2017 Idea Math

<b>1</b>	<b>Counting</b>	<b>3</b>
1.1	The first look at bijection and recursive counting	3
1.1.1	One-to-one correspondence	3
1.1.2	Recursive counting (part 1)	4
1.2	The second look at bijection and recursive counting	6
1.2.1	The famous model: star-and-bars or balls-and-urns	6
1.2.2	Recursive counting (part 2)	7
1.3	The third look at bijection and recursive counting	8
1.3.1	Bijections in geometric models	8
1.3.2	Mixed exercises	8
1.4	Entry level Combinatorics problems from the first 10 years of AIME	10
1.5	Let's count (part 1)	12
1.6	Let's count (part 2)	13
1.7	Practice with binomial coefficients (part 1)	14
1.8	Let's count (part 3)	15
1.9	Practice with binomial coefficients (part 2)	17
1.10	Let's count (part 4)	18

Idea Math S17  
Internal Use, for Chad Q