

Answer Key to
SMC IMONST Workshop 2024
(Day 1: Combinatorics)

§1 Introductory Problems

1)	7	6)	36
2)	2084	7)	12
3)	24	8)	1156
4)	11	9)	55440
5)	20	10)	5

§2 Pigeonhole Principle

Exercise 2.6 8

Exercise 2.7 62

§3 Principle of Inclusion-Exclusion

Exercise 3.3 33*

§4 Permutations and Combinations

Exercise 4.7 36**

Exercise 4.8 10

Exercise 4.9 1287

Exercise 4.10 1. 729 2. 122 3. 28*** 4. 7

§5 Bonus Problems

1)	1232	7)	14	13)	43251	19)	16	25)	55
2)	63	8)	16	14)	6	20)	30	26)	7
3)	64	9)	3456	15)	4464	21)	30	27)	21
4)	198	10)	216	16)	30	22)	0	28)	1020100
5)	10	11)	60	17)	1725	23)	624	29)	3840
6)	15	12)	56	18)	-	24)	5		

*The phrase "...8 takes German, 10 takes both..." in the original problem has been changed to "...8 takes German **only**, 10 takes both..." in the updated version of the handout.

**The problem originally referring to 4-tuples has been changed to 3-tuples to match the rest of the problem description.

***has been changed from "indistinguishable urns" to "distinguishable urns" due to duplicate question