



PHILADELPHIA UNIVERSITY
DEPARTMENT OF BASIC SCIENCES

Second Exam A

DISCRETE STRUCTURES

02-05-2012

Part 1 Each problem is worth 2 points. Circle one answer.

- 1) How many permutations with A, B, B, B, C, C, C, C ?
a) 120 b) 168 c) 280 d) 720
- 2) How many permutations with A, B, C, D, E, F, G contain "ACE" and "BG" ?
a) 6 b) 24 c) 120 d) 720
- 3) How many non-negative integer solutions of the equation $x + y + z = 10$ with condition $x \geq 3$?
a) 15 b) 21 c) 28 d) 36
- 4) Which formula gives the sequence 3, 8, 13, 18, 23, 28, ... ?
a) $S_n = 3n + 5$ b) $S_n = 5n + 3$
c) $S_n = n^2 - 1$ d) $S_n = n^2 + 3$

Part 2 Each problem is worth 4 points. Write complete solution.

- 5) How many integers from 1 to 200 are multiples of 6 or 9 or 10 ?
- 6) Find the formula for the recursive sequence.

$$\begin{aligned} S_n &= S_{n-1} + 12 S_{n-2} \\ S_0 &= 1 \\ S_1 &= 2 \end{aligned}$$

- 7) Prove the formula for all integers $n \geq 1$.

$$1 + 7 + 49 + \dots + 7^{n-1} = \frac{7^n - 1}{6}$$

-Amin Witno