

University of Calgary
Department of Mathematics and Statistics

MATH 271 (L60)

Date of exam
August 7, 2007

QUIZ 4

Duration of exam
35 minutes

STUDENT'S ID: SOLUTION KEY

INSTRUCTIONS: No calculators, open book or formula sheets.

1. [4 marks] An urn contains two blue balls (denoted B_1 and B_2) and three white balls (denoted W_1 , W_2 and W_3). One ball is drawn, its color is recorded, and it is replaced in the urn. Then another ball is drawn and its color is recorded.

- a) What is the probability that the first ball drawn is blue?
b) What is the probability that only white balls are drawn?

a) # of favourable outcomes = 2
of all possible outcomes = 5
 $P(\text{first blue ball}) = \frac{2}{5}$

b) $P(\text{only white}) = \frac{3}{5} \cdot \frac{3}{5} = \frac{9}{25}$

2. [5 marks] How many integers from 1 through 1000 are neither multiples of 2 or multiples of 9?

$A = \# \text{ of multiples of } 2 \text{ from } 1 \text{ through } 1000 = 500$

$B = \# \text{ of multiples of } 9 \text{ from } 1 \text{ through } 1000 = 111$

$C = \# \text{ of multiples of } 18 \text{ from } 1 \text{ through } 1000 = 55$

$D = \# \text{ of multiples of } 2 \text{ or } 9 \text{ from } 1 \text{ to } 1000 = A + B - C = 556$

$\# \text{ of numbers from } 1 \text{ through } 1000 \text{ that are not multiples of } 2 \text{ or } 9$

$= 1000 - D = \underline{\underline{444}}$

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3. [5 marks] Ten points labeled $A, B, C, D, E, F, G, H, I, J$ are arranged in a plane such that no three lie on the same straight line.

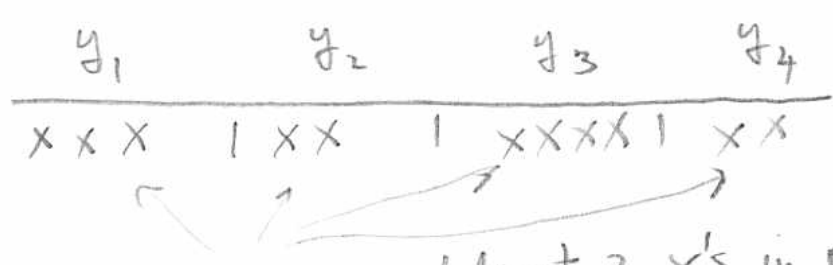
- a) How many straight lines are determined by the ten points?
- b) How many triangles have three of the ten points as vertices?

a, The number of lines determined is the same as the number of 2-element subsets of a set of 10 elements: $\binom{10}{2} = 45$

b, The number of triangles is the same as the number of 3-element subsets of a set of 10 elements: $\binom{10}{3}$.

4 [6 marks] Find how many solutions there are to the given equation that satisfy the given condition.

$$y_1 + y_2 + y_3 + y_4 = 30, \text{ each } y_i \text{ is an integer that is at least 2.}$$



at least 2 x's in each y_i .

There are 22 x's to be distributed among the y_i 's.

- MARKS:
- 1).....
 - 2).....
 - 3).....
 - 4).....
 - Total:.....

$$\binom{22 + 4 - 1}{22}$$