University of Calgary
Department of Mathematics and Statistics

MATH 271 (L60)

Date of exam	**QUIZ 4**	**Duration of exam**
August 7, 2007		**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 = # of multiples of 2 from 1 through 1000 = 500
B = # of multiples of 9 from 1 through 1000 = 111
C = # of multiples of 18 from 1 through 1000 = 55
D = # of multiples of 2 or 9 from 1 to 1000 = A + B − C = 556
# of numbers from 1 through 1000 that are not multiples of 2 or 9
= 1000 − D = 444

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3. [5 marks] Te npoints 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 straigth 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: $\binom{10}{2} = 4$

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.

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

y_1	y_2	y_3	y_4
x x x	| x x	| x x x x	| x x

at least 2 x's in each y_i

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

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

MARKS:

1).........................

2).........................

3).........................

4).........................

Total:......................