MATH 1711, Midterm 1

09/15/2014

Name: key GTID:_____

Circle your section below

D4 TA: Ethan Smith

D5 TA: Pranav Shenoy

Problem No.	Points
1	15
2	10
3	15
4	15
5	15
6	10
7	20

TOTAL: 100

Please do show all your work including intermediate steps. Partial credit is available.

Problem 1 (15 points).

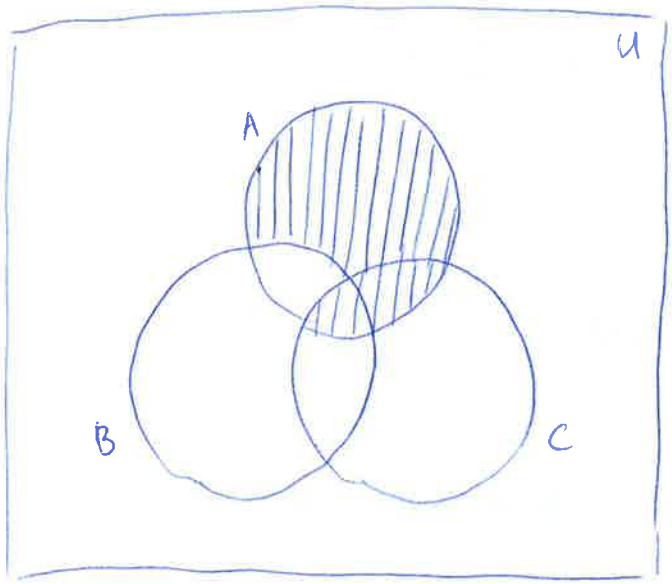
Determine the first three terms in the binomial expansion of $(x-2y)^6$. Simplify your answer as far as possible.

$x^6 - 12x^5y + 60x^4y^2$

or $64y^6 - 192xy^5 + 240x^2y^4$

Problem 2 (10 points).

Draw a three-circle Venn diagram and shade the portion corresponding to the set $A \cap (B' \cup C)$.



Turn over for more problems

Problem 3 (8+7 points).

1. How many shortest grid paths are there from (10,20) to (20,30)? You do *not* need to simplify your final answer.

$$\binom{20}{10}$$

2. How many shortest grid paths are there from (10,20) to (20,30) that do *not* pass through (15,25)? You do *not* need to simplify your final answer.

$$\binom{20}{10} - \binom{10}{5}\binom{10}{5}$$

Problem 4 (15 points).

You, a friend, and six other people are to be seated in a row of eight chairs. How many arrangements are there in which you and your friend are seated next to each other? You do *not* need to simplify your final answer.

$$7 \cdot 2! 6!$$

Turn over for more problems

Problem 5 (5+10 points).

An experiment consists of tossing a coin three times and recording the outcomes.

1. Find the sample space for this experiment.

S.S. = {HHH, HHT, HTH, THH, TTH, THT, HTT, TTT}

2. Let E={at least two head appear} and let F={the first toss is a tail}. Describe the events E, F, and $E' \cap F$.

$E = \{HHH, HHT, HTH, THH\}$

$F = \{THH, THT, TTH, TTT\}$

$E' \cap F = \{THT, TTH, TTT\}$

Problem 6 (10 points).

In a certain month (of 30 days) it rains 10 days, snows 2 days, and is clear 18 days. In how many ways can such weather be distributed over the month? You do *not* need to simplify your final answer.

$$\binom{30}{10, 2, 18}$$

Turn over for more problems

Problem 7 (10+10 points).

Apple Inc. surveyed 400 people to determine from what source they found out about an upcoming sale of iPhone 6. The results of the survey follow:

180 from the internet

190 from television

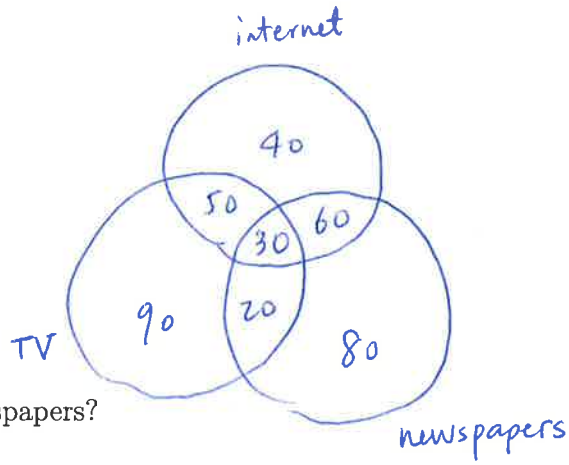
190 from newspaper

80 from internet and television

90 from internet and newspapers

50 from television and newspapers

30 from all three sources



1. How many people learned of the sale only from newspapers?

80

2. How many people learned of the sale from at least two of the three media?

160

The End.

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