

MATH 210 PRACTICE EXAM 1
Semester I, 2006-2007 Lecture 4

Name: _____

Section: _____

NO CALCULATORS, NOTES, BOOKS, ETC. ALLOWED.
EXPLAIN YOUR WORK.
ANSWERS WITHOUT EXPLANATION WILL RECEIVE 0 CREDIT.

1. Sets A, B, C are subsets of a universal set U , and they satisfy:

$$\begin{array}{llll} n(A \cap B \cap C) = 2 & n(A \cap C) = 10 & n(A \cap B) = 12 & n(B \cap C) = 8 \\ n(A \cup B) = 40 & n(A \cup C) = 50 & n(B) = 20 & n(U) = 100 \end{array}$$

Find $n((A \cup B \cup C)')$.

2. Let \Pr be a probability measure on S with $E, F \subset S$. Assume that $\Pr[F] = \frac{1}{3}$, $\Pr[E \cup F] = \frac{2}{3}$, and $\Pr[E \mid F] = \frac{1}{2}$. Find $\Pr[E]$ and $\Pr[E \cap F]$.

Name: _____

Section: _____

3. Let \Pr be a probability measure on S with $E, F, G \subset S$. Assume that they satisfy:

$$\Pr[E] = 0.3$$

$$\Pr[F] = 0.45$$

$$\Pr[G] = 0.5$$

$$\Pr[E \cup F] = 0.6$$

$$\Pr[E \cup G] = 0.7$$

$$\Pr[F \cup G] = 0.8$$

$$\Pr[E \cap F \cap G] = 0.05$$

Find $\Pr[E \cup F \cup G]$.

4. A deck of 12 cards contains only 4 Jacks, 4 Queens, and 4 Kings. Out of this, a hand of 3 cards is dealt at random. Let E be the event that the hand contains exactly one Jack. Let F be the event that the hand contains exactly one Queen. Find $\Pr[E \mid F]$. Your answer should be a simple fraction (of form $\frac{m}{n}$).

Name: _____

Section: _____

5. A die is rolled repeatedly until the sum of all the numbers rolled is 3 or greater. Find the sample space of this experiment. You can either draw a tree here, or you can just list all the possible outcomes.

6. A bowl of fruit contains a red apple, a green apple, and a banana. You grab one fruit. Assume that each of the two apples is equally likely to be grabbed, but the banana is half as likely to be grabbed as is either of the apples. What is the probability of grabbing one of the apples? Your answer should be a simple fraction (of form $\frac{m}{n}$).

Name: _____

Section: _____

7. $n(S) = 10$. How many subsets of S have 7 or more elements? Your answer should be a whole number.

8. A standard deck of cards contains 52 cards; there are 13 of each of the four suits. You randomly deal out a hand of 9 cards. What is the probability that your hand will contain exactly 3 clubs, 2 diamonds, and 2 spades? Your answer should be of the form $\frac{\text{a product of whole numbers}}{\text{another product of whole numbers}}$; you don't have to simplify it.

Name: _____

Section: _____

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