

Math 210, Lec. 3, Fall 1999

NAME:

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Section/Day/Time:

EXAM 1, September 24, 1999

SCORE:

NOTE: There are four major questions I,II, II, IV. Answers should not be computed unless specifically asked. You may leave your answers in the form $P(n,r), C(n,r), n!$. Answers given as a number (e.g. 720) with no indication of the reasoning involved are not acceptable.

I. 20 points

(a) Write using factorials and then compute:

$$P(8,3) =$$

$$C(7,3) =$$

(b) A bag contains pennies, nickels, and dimes. The number of nickles is three times the number of pennies; the number of dimes is five times the number of pennies. If an experiment consists of drawing a coin at random from the bag, how should probabilities be assigned to penny, nickel, and dime?

II. 30 points License plates are composed of 7 symbols taken from ten digits $0, 1, \dots, 9$ and the 26 letters A, B, \dots, C (repeats allowed unless otherwise specified). Find:

(a) The total number of license plates.

(b) The total number of license plates where the first three symbols are **different** letters and the last four are **different** digits.

(c) The number of license plates with at least one letter.

(e) The number of license plates with two A s and no other letters.

III. 30 points An ordinary deck contains 52 cards of 13 ranks and 4 suits. A four-card hand is dealt. **Find:**

(a) The number of possible hands.

(b) The number of hands containing one card of each of the four suits.

(c) The number of hands containing three cards of one suit and one of a different suit.

(d) The number of hands containing only cards of the same suit.

(e) The probability that a hand contains at least three cards of the same suit.

IV. 20 points E and F are events in the sample space of an experiment. It is known that

$$Pr[E] = 0.60, Pr[F] = 0.50, Pr[(E \cup F)'] = 0.20.$$

(a) Calculate $Pr[E \cap F]$.

(b) Calculate $Pr[E' | F]$.

(c) Are E' and F independent?