

**MTH 110**  
**Quiz 7**  
**Summer 2008**

Show all work in a neat and organized fashion. Clearly indicate your answers.  
50 points possible.

The following formulas may or may not be useful.

$${}_nP_r = \frac{n!}{(n-r)!} \quad {}_nC_r = \frac{n!}{(n-r)!r!}$$

$$P(\text{not } E) = 1 - P(E)$$

$$P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)$$

A standard deck of cards has 52 cards.

There are 4 suits: spades, hearts, diamonds, clubs.

There are 13 ranks in each suit: Ace, 2, 3, 4, 5, 6, 7, 8, 9, 10, Jack, Queen, King.

The Jack, Queen, and King are called picture cards, or face cards.

The spades and clubs are black.

The hearts and diamonds are red.

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1. (10 pts.) Compute:

(a)  $6! - 4!$

(b)  $\frac{800!}{798!}$

(c)  ${}_8P_8$

(d)  ${}_8C_5$

(e)  ${}_{11}C_3 \cdot {}_8C_5$

2. (4 pts.) You can purchase a particular model of a new car with a choice of twelve colors, with or without automatic transmission, with or without four-wheel drive, with or without air conditioning, with or without a power drivers seat, and with two, three, or four radio-CD speakers. In how many different ways can you order the car?

3. (4 pts.) You are taking a multiple-choice test that has six questions. Each of the questions has four answer choices, with one correct answer per question. If you select one of these four choices for each question and leave nothing blank, in how many ways can you answer the questions?

4. (4 pts.) Suppose you are asked to list, in order of preference, the six favorite CDs you purchased in the past 10 months. If you bought 15 CDs over this time period, in how many ways can the six favorite be ranked?

5. (4 pts.) You need to arrange nine of your favorite books along a small shelf. Although you are not arranging the books by height, the tallest of the books is to be placed at the left end and the shortest of the books is to be placed at the right end. How many different ways can you arrange the books?

6. (4 pts.) In how many distinct ways can the letters of the word SNIDENESSES be arranged?

7. (4 pts.) How many different 5-card hands can be dealt from a deck that has only diamonds (13 different cards)?

8. (4 pts.) You are dealt one card from a 52-card deck. Find the probability of being dealt a card greater than 3 and less than 10.

9. (4 pts.) Suppose that you reach into a bag and randomly select one piece of candy from 12 chocolates, 15 caramels, and 4 peppermints. Find the probability of selecting a chocolate.

10. (8 pts.) Suppose that a survey of 350 college students is taken. Each student is asked the type of college attended (public or private) and the family's income level (low, middle, high). The table displays the results.

	Public	Private
Low	120	20
Middle	110	50
High	22	28

(a) Find the probability that a randomly selected student in the survey is not from a high-income family.

(b) Find the probability that a randomly selected student in the survey attends a public college or is from a middle-income family.

**Optional Bonus Problem 1.** (4 optional bonus points) A single die is rolled twice. Find the probability of rolling a number greater than 4 the first time and a number less than 6 the second time.

**Optional Bonus Problem 2.** (4 optional bonus points) You draw one card from an ordinary deck. Then you put the card aside, and draw again. Find the probability of drawing a heart each time.