Math 107 Sec. 1
Montgomery
February 27, 2008 Exam 2

Answers
Pink

Show work!

1. $U = \{x \mid x \text{ is an integer between 1 and 10 inclusive}\}$
$A = \{1, 2, \ldots, 6\}$, $B$ is the set of even integers in $U$, and $C = \{5, 6, \ldots, 10\}$.

8 a. $A' \cup C = \{7, 8, 9, 10\} \cup \{5, 6, \ldots, 10\} = \{5, 6, \ldots, 10\}$

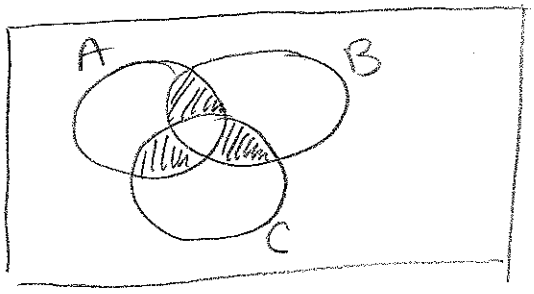
8 b. $B \cap (A' \cup C)' =$
$= \text{evens in } \{5\text{–}10\}'$
$= \text{evens in } \{1\text{–}4\}$
$= \{2, 4\}$

$B \cap A \cap C' = \text{evens in A but not in C}$
$\{1, 2, 3, 4\}$
$= \{2, 4\}$

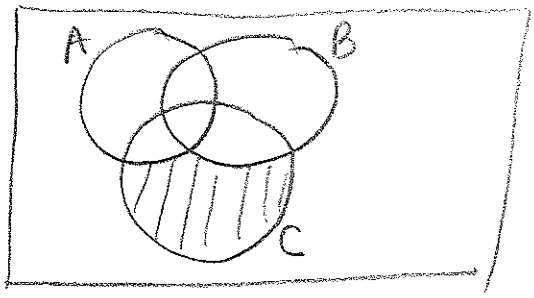
$(A \cap C') = (A' \cup C)'$

2. In a survey, students were asked if they liked apples, if they liked bananas, and if they liked cherries.

5 a. Draw a Venn diagram that could be used to represent the results of the survey, and shade the area that would represent the students who liked two of the three fruits.




8 b. What people are represented by the shaded area below. Describe in English, and then in symbols.

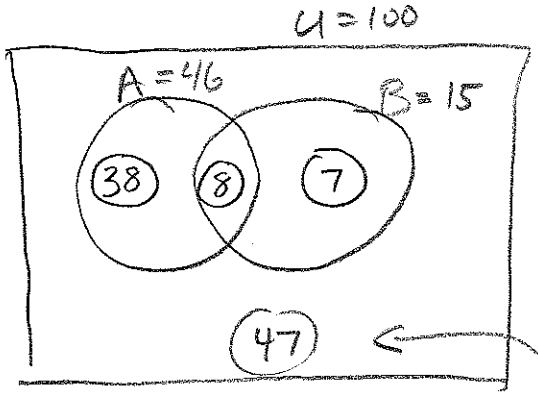



$A' \cap B' \cap C$
Those who like only cherries

29

3. 46% of people have the A-antigen in their blood, 15% have the B-antigen in their blood, and 8% have both. Type O blood has neither. Use a Venn diagram to determine the percentage of the population that has type O blood.

(10)




100
- 46
54
- 7
47

47%

4. Show factors and compute:

(4) a. ${}_{11}P_4 =$ 11 10 9 8 = 7,920

7,920

(4) b. ${}_{21}C_3 =$ $\frac{\cancel{21}^{7}\ \cancel{20}^{10}\ 19}{\cancel{3}\ \cancel{2}\ 1} = 1330$

1330

(4) c. ${}_{10}C_4 \times {}_{8}C_4 =$ $\frac{10\ \cancel{9}^{3}\ \cancel{8}^{2}\ 7}{\cancel{4}\ \cancel{3}\ \cancel{2}\ 1} \times \frac{\cancel{8}^{2}\ 7\ \cancel{6}^{3}\ 5}{\cancel{4}\ \cancel{3}\ \cancel{2}\ 1} = 10 \cdot 3 \cdot 7 \cdot 7 \cdot 2 \cdot 5 = 14700$

5. Three cards are dealt from a standard deck.

(5) a. How many outcomes are possible? 52 × 51 × 50 = 132,600

(5) b. How many outcomes have the first and the second both spades, and the third anything.

13 × 12 × 50 = 7800

(5) c. How many outcomes do not have the description in part b?

a) − b) = 132,600 − 7800 = 124,800

6. A certain model of automobile is available in five exterior colors, four interior colors, and three interior styles. In addition, the transmission can be either manual or automatic, and the engine can have either four or six cylinders. How many different versions of the automobile can be ordered?

$5 \times 4 \times 3 \times 2 \times 2 = 240$

7. A committee of four is to be selected from a group of 16 people. How many different committees are possible, given the following conditions?

   a. One person is the chair, one is the secretary, one is responsible for cleanup, and the last for refreshments.

   $16 \times 15 \times 14 \times 13 = 43680 = {}_{16}P_4$ 43680

   b. One person is the chair, and the rest are general members.

   $16 \times {}_{15}C_3$ 7280

   c. There is no distinction between the responsibilities of the members.

   ${}_{16}C_4$ 1820

8. a) How many 6-card hands contain only hearts?

   ${}_{13}C_6$ 1716

   b) How many 6-card hands consist of all cards of the same suit?

   $4 \times {}_{13}C_6$ 6864

32
21
53