

Remember that you may use a calculator and a sheet of paper with formulas and definitions on it.

1) Let $A = \{2, 5, 8, z, \$\}$, $B = \{5, \uparrow, z, 8, p\}$, and $C = \{2, z, 9, p, \Delta\}$. Find the following:

a) $A \cup (B \cap C)$

b) $(A \cup B) \cap C$

c) $A \cap (B \cup C)$

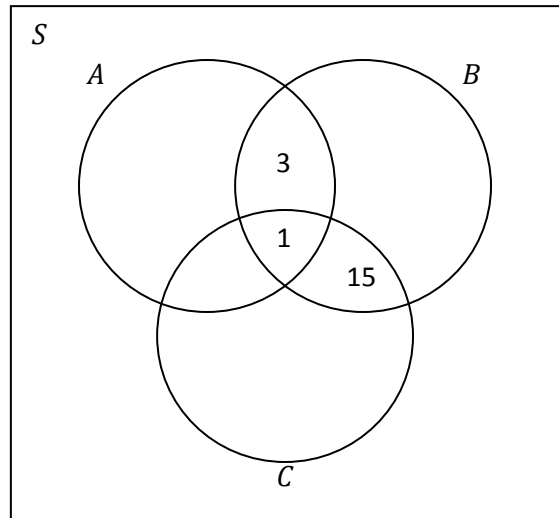
d) $A \cap (B \cap C)$

e) Draw a Venn diagram that shows the relationships between A , B , and C .

f) Find $n(A \times B)$

2) During a midnight showing of "Gone With the Wind", Tom noticed that there were 46 other people in the theater. He also noticed that all of these other people were either sleeping or wearing hats (or both). He counted 31 people sleeping and 24 wearing hats. How many people who were sleeping were also wearing hats?

- 3) Use the given information to complete the solution of the partially solved Venn Diagram.



$$n(A) = 30, n(B) = 25, n(C) = 33,$$

$$n(A \cap C) = 10, n(S) = 60$$

- 4) A test has 15 true-false questions, then a choice of either completing 5 multiple choice questions with 1 correct answer out of 4, or completing 4 multiple choice questions with 1 correct answer out of 5. How many different completed answer sheets are there?
- 5) The following table shows the results of a survey of 200 authors by a publishing company.

| | New Authors | Established Authors | Total |
|--------------|-------------|---------------------|-------|
| Successful | 16 | 44 | 60 |
| Unsuccessful | 38 | 102 | 140 |
| Total | 54 | 146 | 200 |

Compute the relative frequency of the following events.

- An author is successful and new.
- An author is a new author.
- A successful author is established.
- An established author is successful.
- An unsuccessful author is new.

- 6) At the dog track, you notice that there are 10 dogs racing. You place a bet that you can guess the top three finishers of the race in the exact order that they come in.
- a) How many different ways can the dogs finish 1st, 2nd, and 3rd place?

 - b) What is the probability that you win your bet if you select your three dogs at random?
- 7) Refer to #6. You lost your bet and now decide to bet on three dogs to finish in the top three in any order.
- a) How many different sets of dogs can finish in the top three?

 - b) What is the probability that you win your bet if you select your three dogs at random?
- 8) A bag of coins contains 5 quarters, 3 nickels, 2 dimes, and 6 pennies.
- a) How many sets of 5 coins include 2 quarters and no nickels?

 - b) How many sets of 6 coins include at least one dime?

 - c) How many sets of coins include one of each type of coin?

d) You randomly pull 3 coins out of the bag. What is the probability that exactly one of the coins is a nickel?

9) You toss a nickel, a dime, and a quarter once each.

a) Find the number of elements of the sample space S for this experiment, that is, find $n(S)$.

b) Let E be the event that at most one of the coins comes up tails, and let F be the event that the quarter comes up heads. Find the following:

i) $n(E)$

ii) $n(F)$

iii) $n(E \cap F)$

iv) $P(E)$

v) $P(F)$

vi) $P(E \cap F)$

In addition to these problems, you should also look again at the homework problems and the worksheets.