List the elements of the given set in roster notation.

1. {x I 3x -2 =7; x is an integer}
2. {x I (x-3)(x+4) = 0; x is a negative integer}

Let U={a,b,c,d,e}, A={a,b}, B={b,c,d} and C={a,d,e}.

3. Show A U (B U C) = (A U B) U C
4. Show $A\cap(B\cup C)=(A\cap B)\cup(A\cap C)$

Let U = {all participants in a consumer behavior survey conducted by a national polling group}
*   A = {consumers who avoided buying a product because it is not recyclable}*
*   B = {consumers who used cloth rather than disposable diapers}*
*   C = {consumers who boycotted a company's products because of their record on the*
*   environment}*
*   D = {consumers who voluntarily recycled their garbage}*

Using the above sets, describe the following in words.

5. $A\cap C$
6. $B^C \cap D$

7. The department of foreign languages of a liberal arts college conducted a survey of the recent graduates to determine the foreign language courses they had taken while undergraduates at the college. Of the 480 graduates:

   200 had at least 1 year of Spanish
   178 had at least 1 year of French
   140 had at least 1 year of German
   33 had at least 1 year of Spanish and French
   24 had at least 1 year of Spanish and German
   18 had at least 1 year of German and French
   3 had at least 1 year of all three languages

   How many of the graduates had
   a. At least 1 year of at least one of the three languages?
   b. At least 1 year of exactly one of the three languages?
   c. Less than 1 year of any of the three languages?

8. In how many ways can six different CD's be arranged on a shelf?

9. In how many ways can three pictures be selected from a group of six different pictures?

10. Find the number of distinguishable permutations that can be formed from the letters of each word?
   a. CINCINNATI   b.   HONOLULU

11. Let E and F be two mutually exclusive events and suppose P(E) = .4 and P(F) = .2

$$a. P(E \cap F)$$

$$b. P(E \cup F)$$

$$c. P(E^C)$$

$$d. P(E^C \cap F^C)$$

$$e. P(E^C \cup F^C)$$

12. Let E and F be two events of an experiment with sample space S. Suppose P(E) = .3 and P(F) = .2, and
   $P(E \cap F) = .15$

   Compute:

$$a. P(E \cup F)$$

$$b. P(E^C \cap F^C)$$

$$c. P(E^C \cap F)$$

13. A die is loaded, and it is determined that the probability distribution associated with the
     experiment of casting the die and observing which number falls uppermost is given by

Simple Event	Probability
1	.20
2	.12
3	.16
4	.18
5	.15
6	.15

   a.   What is the probability of the number being even?
   b.   What is the probability of the number being either a 1 or a 6?
   c.   What is the probability of the number being less than 4?

14.   An urn contains six red, five black, and four green balls. If two balls are selected at
      random without replacement from the urn, what is the probability that a red ball and
      a black ball will be selected?

Unit 1 Test Review   Sets & Probability   Name: _____

15.   The quality control department of Starr Communications, the manufacturer of video
       game CD's, has determined from records that 1.5% of the CD's have video defects,
       0.8% have audio defects and 0.4% have both audio and video defects. What is the
       probability that a video game purchased by a customer

       a.   Will have a video or audio defect (can be both)?
       b.   Will not have a video or audio defect?

16.   Let E and F be two events and suppose P(E) =.35 and P(F) = .55 and P(EUF)=.70. Find P(E|F).

For 17-21, use the tree diagram to find the given probability.
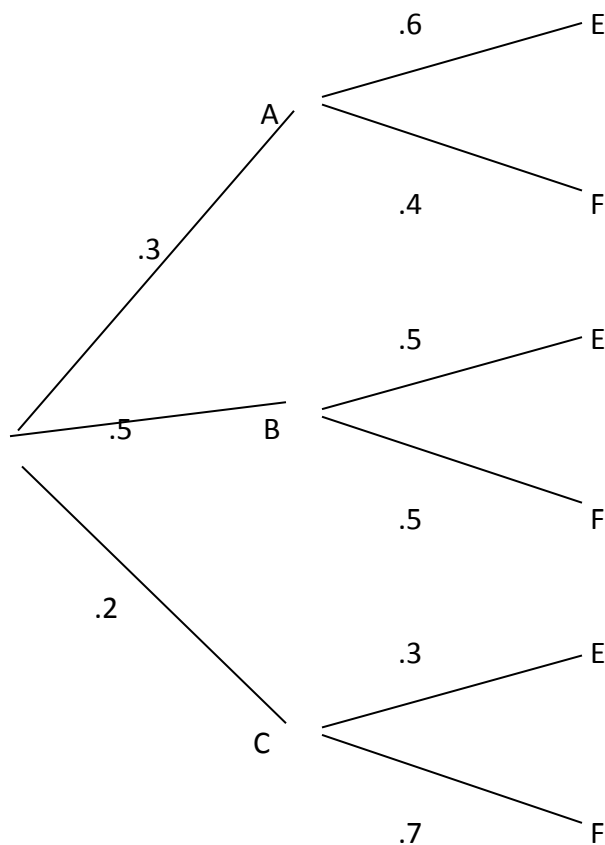
$17. P(A \cap E)$

$18. P(B \cap E)$

$19. P(C \cap E)$

$20. P(A|E)$

$21. P(E)$

22.   An experiment consists of tossing a fair coin three times and observing the
       outcomes. Let A be the event that at least one head is thrown and B the event that at
       most two tails are thrown.
       a.   Find P(A).
       b.   Find P(B).
   c.   Are A and B independent events?

23.   In a group of 20 ballpoint pens on a shelf in the stationary department of Metro
       Department Store, 2 are known to be defective. If a customer selects 3 of these
       pens, what is the probability that
       a.   At least 1 is defective?

24.   Five people are selected at random. What is the probability that none of the people
       in this group were born on the same day of the week?   **OMIT QUESTION**

25.   A pair of fair dice is cast. What is the probability that the sum of the numbers falling
       uppermost is 8 if it known that the two numbers are different?

26.   A fair dice is cast three times. What is the probability that it shows an even
       number in the first toss, an odd number in the second toss, and a 1 on the third toss?
       Assume that the outcomes of the tosses are independent.

27.   A fair die is cast, a fair coin is tossed, and a card is drawn from a standard deck of 52
       playing cards. Assuming these events are independent, what is the probability that
       the number falling uppermost on the die is a 6, the coin shows a tail and the card
       drawn is a face card?

**For 28 – 32, All cards are drawn from a standard deck of 52 playing cards and not replaced. Find the
probability of each of the given events.**

28.   All three cards drawn are aces.

29.   All three cards drawn are face cards.

30. Of the three cards, the second and third cards are red.

31. Two cards are drawn and the second card is black, but the first card was red.

32.   Two cards are drawn and the second card is a club, but the first card was black.

33.   Of 320 male and 280 female employees at the home office of Gibraltar Insurance Company, 160 of the
       men and 190 of the women are on flex-time (flexible working hours). Given that an employee selected at
       random from this group is on flex-time, what is the probability that the employee is a man?

34. Applicants who wish to be admitted to a certain professional school in a large university are required to
       take a screening test that was devised by an educational testing service. From past results, the testing
       service has estimated that 70% of all applicants are eligible for admission and that 92% of those who are
       eligible for admission pass the exam, whereas 12% of those who are ineligible for admission pass the
       exam. Using these results, what is the probability that an applicant for admission passed the exam?

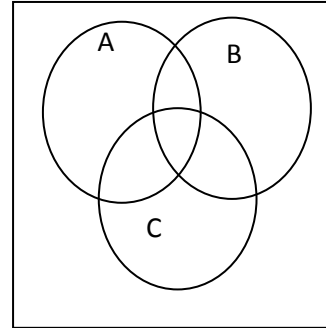35. Given sets A, B, and C as shown, shade the following:

a. $A^c \cap B \cap C^c$
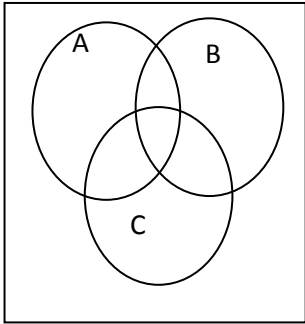
b. $(A \cap B) \cap (B \cup C)$
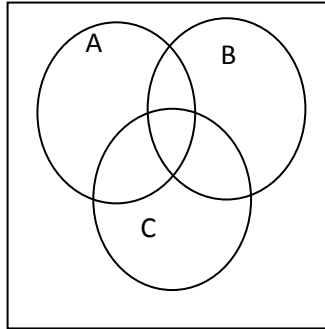
c. $(A^c \cap B^c) \cup (A \cap B)^c \cup C$

36. The following data is a comparison of laptops versus desktops purchased from a consumer electronics store in 1 month period.

	Laptops (L)	Desktops (D)	Totals
Dell (DL)	114	38	152
HP (H)	72	57	129
Lenovo (V)	43	41	84
Asus (A)	22	13	35
Apple (P)	165	101	266
Toshiba (T)	98	63	161

Given the above information, find the following:

a. $L \cap V$

b. $(P \cup DL)^c \cap (L \cup D)$

c. $H^c \cup D$