

List the elements of the given set in roster notation.

- $\{x \mid 3x - 2 = 7; x \text{ is an integer}\}$ {3}
- $\{x \mid (x-3)(x+4) = 0; x \text{ is a negative integer}\}$ {-4}

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

- Show $A \cup (B \cap C) = (A \cup B) \cap (A \cup C) = \{a, b, c, d, e\} = \{a, b, c, d, e\}$
- Show $A \cap (B \cup C) = (A \cap B) \cup (A \cap C) = \{a, b\} = \{a, b\}$

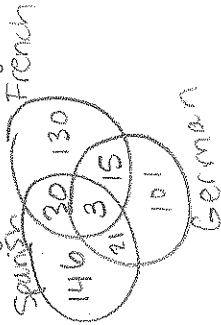
Let $U = \{ \text{all participants in a consumer behavior survey conducted by a national polling group} \}$

- $A = \{ \text{consumers who avoided buying a product because it is not recyclable} \}$
- $B = \{ \text{consumers who used cloth rather than disposable diapers} \}$
- $C = \{ \text{consumers who boycotted a company's products because of their record on the environment} \}$
- $D = \{ \text{consumers who voluntarily recycled their garbage} \}$

- Using the above sets, describe the following in words.
- $A \cap C = \text{a product that is not recyclable and boycotted}$
 - $B \cap D = \text{did not use cloth diapers and recycled garbage}$

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

- At least 1 year of at least one of the three languages? 446
 - At least 1 year of exactly one of the three languages? 377
 - Less than 1 year of any of the three languages? 34
8. In how many ways can six different CD's be arranged on a shelf? 6! or 6*5*4*3*2*1 = 720
9. In how many ways can three pictures be selected from a group of six different pictures? 6C3 = 20

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

- CINCINNATI 10! 10!
- HONOLULU $\frac{8!}{2!2!2!} = 5040$

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

- $a. P(E \cap F) = 0$
- $b. P(E \cup F) = .4 + .2 = .6$
- $c. P(E^c) = .6$
- $d. P(E^c \cap F^c) = P(E \cup F)^c = 1 - (E \cup F) = 1 - .6 = .4$
- $e. P(E^c \cup F^c) = P(E \cap F)^c = 1 - (E \cap F) = 1 - 0 = 1$

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:

- $a. P(E \cup F) = .35$
- $b. P(E^c \cap F^c) = 1 - P(E \cup F) = .65$
- $c. P(E^c \cap F) = .05$

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

- What is the probability of the number being even? $.12 + .18 + .16 = .46$
- What is the probability of the number being either a 1 or a 6? $.2 + .15 = .35$
- What is the probability of the number being less than 4? $.16 + .12 + .2 = .48$

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?

$$\left(\frac{6}{15} \cdot \frac{5}{14} \right) + \left(\frac{5}{15} \cdot \frac{6}{14} \right) = .286 + .286 = 2/7$$