

2.2 Describing Sets/2.3 Other Set Operations and Their Properties

Set--

element--

list vs. set-builder notation

cardinality of a set-- $n(S)$

Symbols to know:

\in

\emptyset

finite vs. infinite sets

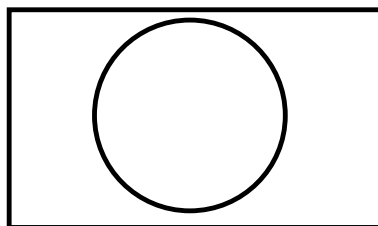
equal sets: $A = B$

equivalent sets: $A \sim B$ (there's a one-to-one correspondence)

subset: $A \subseteq B$

Ex.

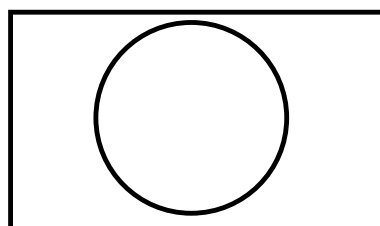
Venn Diagram



proper subset: $A \subset B$

Ex.

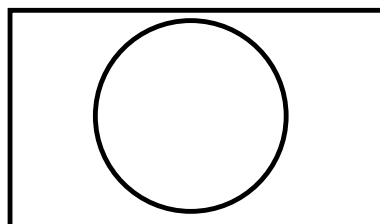
Venn Diagram



set complement: \bar{A}

Ex.

Venn Diagram

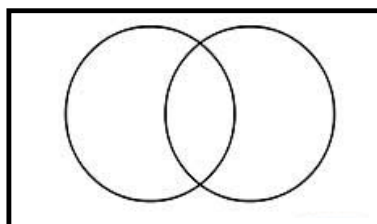


set difference: $A - B$

Ex.

(Note: your book calls this relative complement.)

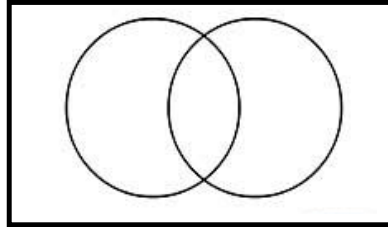
Venn Diagram



set intersection: $A \cap B$

Ex.

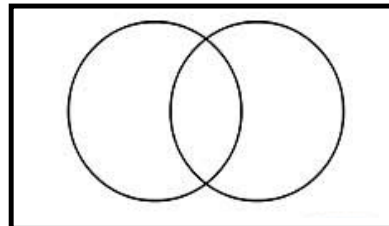
Venn Diagram



set union: $A \cup B$

Ex.

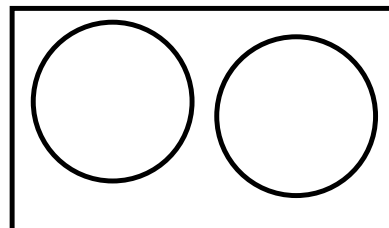
Venn Diagram



disjoint sets: $A \cap B = \emptyset$

Ex.

Venn Diagram



Commutativity:

$$A \cup B = B \cup A \quad \text{and} \quad A \cap B = B \cap A$$

Associativity:

$$A \cup (B \cup C) = (A \cup B) \cup C$$

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

Distributivity:

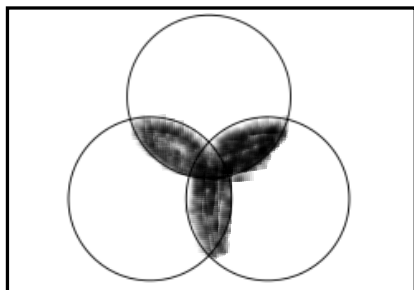
$$A \cap (B \cup C) = (A \cap B) \cup (A \cap C)$$

calculate the number of subsets of a set A

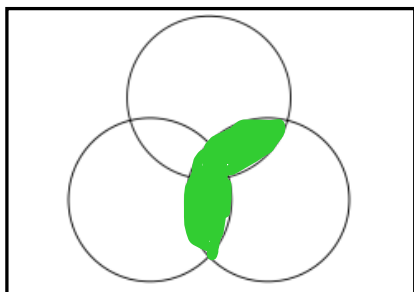
$n(A)$	# subsets of A

Ex: Given Venn Diagram, give set combination that would produce the shaded region.

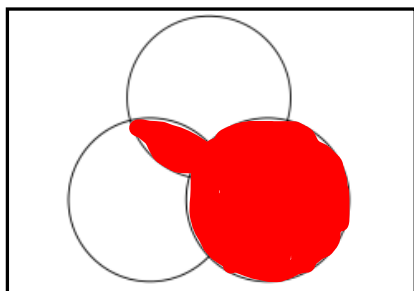
(a)



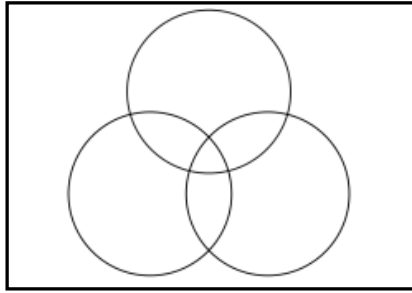
(b)



(c)



Ex: Shade in the region given by $(A - B) \cap C$

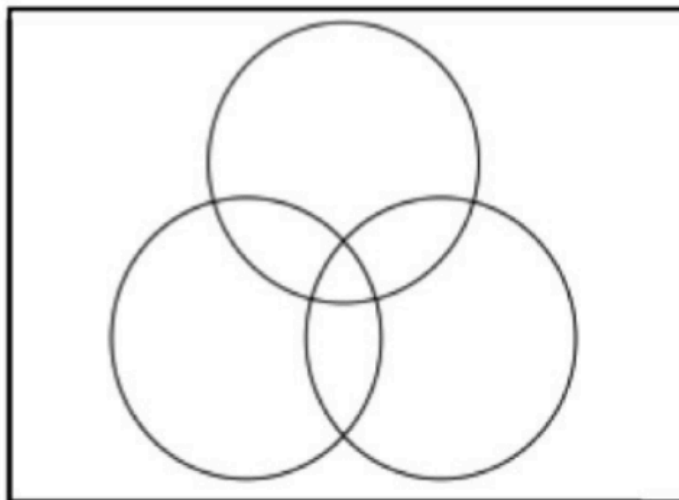


(From homework)

Use a Venn Diagram to summarize and analyze the data in each problem. Then use it to answer the questions.

1. Toward the middle of the season, peaches for canning tend to come in three types: early, late and extra late, depending on the expected date of ripening. During one week, the following data were recorded at a small peach receiving station.

- 16 trucks were dispatched carrying early peaches
- 36 trucks had late peaches
- 33 trucks had extra late peaches
- 13 trucks had early and late peaches
- 15 trucks had late and extra late peaches
- 1 truck had early and extra late peaches
- no trucks had all three types



Determine the number of trucks:

- (a) carrying only late peaches
 - (b) carrying only one variety of peaches
 - (c) carrying exactly two varieties of peaches
- (d) Determine the total number of trucks.