iii) Let $A = \{0, \{0, y\}, y, \{6\}, 6, x, \phi\}$ $B = \{\{0\}, \{\phi\}, \{6\}, \{6, x\}, 6, y, 23, 10, \{\{0\}, \{6, x\}\}\}$.

Write T or F.

a) $\{\{0\}, \{6, x\}\} \in B \rightarrow$ T.

b) $\{\underbrace{\{0\}}_{}, \underbrace{\{6, x\}}_{}\} \subset B$

elements. Check $\{0\} \in B \checkmark$

$\{6, x\} \in B \checkmark$

$\therefore \{\{0\}, \{6, x\}\} \subset B \rightarrow$ T.

c) $\{\phi\} \in A \rightarrow$ F

d) $\{\phi\} \in B \rightarrow$ T

e) $\{\phi\} \subset B$

check. $\phi \in B$ ×

$\therefore \{\phi\} \subset B \rightarrow$ F

f) $\{\phi\} \subset A$

check $\phi \in A \checkmark$

$\therefore \{\phi\} \subset A \rightarrow$ T

g) $\phi \in A \rightarrow$ T

h) $\{23, 10, y\} \in B \rightarrow$ F

i) $\{23, 10, y\} \subset B$

Check $23 \in B \checkmark$ $10 \in B \checkmark$ $y \in B \checkmark$

$\therefore \{23, 10, y\} \subset B \rightarrow$ T

j) $\{6\} \in A \cap B$

First: $A \cap B = \{y, \{6\}, 6_x\}$

$\therefore \{6\} \in A \cap B \rightarrow$ T.

k) $\{6\} \subset A \cap B$

check $6 \in A \cap B \rightarrow \checkmark$

$\therefore \{6\} \subset A \cap B \rightarrow$ T

l) $(10, x) \in \cancel{A \cap B}\ A \times B$

10 should be from set A. ×

$x \in B$. ×

$\therefore (10, x) \in A \times B \rightarrow$ F

m) $\{\underbrace{(\{0, y\}, 6)}_{\text{element}}, \underbrace{(y, \{0\})}_{\text{element}}\} \subset A \times B$

$\{0, y\} \in A \checkmark$ $y \in A \checkmark$ $\therefore \{(\{0, y\}, 6), (y, \{0\})\} \subset A \times B \rightarrow$ T

n) Find $A \cap B$.

$A \cap B = \{ y, \{6\}, 6 \}$.

o) Find $B - A$ i.e elements in B that are not in A.

$B - A = \{ \{0\}, \{\phi\}, \{6, x\}, 23, 10, \{\{0\}, \{6, x\}\} \}$.

p) Find $|A \times B|$. i.e find the cardinality of the cartesian product $A \times B$

$|A| = 7$

$|B| = 9$

$|A \times B| = 63$.

13/08/18

A is a set. $|A| = n < \infty$

$P(A)$ = power set = { all subsets of A } , $|P(A)| = 2^n$

eg: $A = \{a, b\}$, $|A| = 2$

Find $P(A)$, $|P(A)|$.

in every set, the whole set is a subset of itself. and the empty set is always a subset of any set.

$P(A) = \{ \{a, b\}, \phi, \{a\}, \{b\} \}$.

Statements:

$\{a\} \in P(A) \to T$

$a \in P(A) \to F$

$a \in A \to T$

$\{\{a\}, \{b\}\} \subset P(A) \to T$

$\{\phi, \{a\}\} \subset P(A) \to T$

$\phi \in P(A) \to T$

$\phi \subset P(A) \to T$ by default.

$\{\phi\} \subset P(A) \to T$

eg: $A = \{a, b, 3\}$, $|A| = 3$

$|P(A)| = 8$

$P(A) = \{ A, \phi, \{a\}, \{b\}, \{3\}, \{a, b\}, \{a, 3\}, \{b, 3\} \}$. *remember, order does not matter.

Statements:

$A \in P(A) \to T$

$A \subset P(A) \to F$

$\{A\} \subset P(A) \to T$