1. (6 pts)

Let

$$A = \{a, \{a\}, \{\{a\}\}\} \qquad B = \{a\} \qquad C = \{\emptyset, \{a, \{a\}\}\}$$

Which of the following statements are true? For those that are not, where do they fail?

a. $B \subseteq A$
b. $B \in A$
c. $C \subseteq A$
d. $\emptyset \subseteq C$
e. $\emptyset \in C$
f. $\{a, \{a\}\} \in A$
g. $\{a, \{a\}\} \subseteq A$
h. $B \subseteq C$
i. $\{\{a\}\} \subseteq A$

a. True

b. True

c. False because $\emptyset \notin A$

d. True

e. True

f. False because $\{a, \{a\}\} \notin A$, $\{a, \{a\}\} \subset A$

g. True

h. False because $\{a\} \not\subseteq C$

i. True

1. (6 pts)

Let

$$A = \{a, \{a\}, \{\{a\}\}\} \qquad B = \{a\} \qquad C = \{\emptyset, \{a, \{a\}\}\}$$

Which of the following statements are true? For those that are not, where do they fail?

a. $B \subseteq A$ ✓
b. $B \in A$ ✓
c. $C \subseteq A$ ✗
d. $\emptyset \subseteq C$ ✓
e. $\emptyset \in C$ ✓
f. $\{a, \{a\}\} \in A$ ✗
g. $\{a, \{a\}\} \subseteq A$ ✓
h. $B \subset C$ ✗
i. $\{\{a\}\} \subseteq A$ ✓

c. $C \subseteq A$ fails because $\{a, \{a\}\}$ does not appear in A ($\{a\}$ and a are separate elements in A)

✓ f. $\{a, \{a\}\} \in A$ fails because $\{a, \{a\}\}$ considered as a singular element doesn't exist in A.

H. $B \subseteq C$ fails because a alone does not occur as an element in C.

10

Let

$$A = \{a, \{a\}, \{\{a\}\}\} \qquad B = \{a\} \qquad C = \{\emptyset, \{a, \{a\}\}\}$$

Which of the following statements are true? For those that are not, where do they fail?

a. $B \subseteq A$
b. $B \in A$
c. $C \subseteq A$
d. $\emptyset \subseteq C$
e. $\emptyset \in C$
f. $\{a, \{a\}\} \in A$
g. $\{a, \{a\}\} \subseteq A$
h. $B \subseteq C$
i. $\{\{a\}\} \subseteq A$

a. true

b.) true

c.) False
$\{a, \{a\}\} \notin A$ Thus $C \not\subseteq A$ ✓

d.) true

e.) true

f) False
The set of (a and the set of a)
is not a member of A. ✓

g) true

h.) False, C has 2 members, $\emptyset$ and $\{a, \{a\}\}$ ✓
neither one is $\{a\}$

1. (6 pts)

Let

$$A = \{a, \{a\}, \{\{a\}\}\} \qquad B = \{a\} \qquad C = \{\emptyset, \{a, \{a\}\}\}$$

Which of the following statements are true? For those that are not, where do they fail?

a. $B \subseteq A$
b. $B \in A$
c. $C \subseteq A$
d. $\emptyset \subseteq C$
e. $\emptyset \in C$
f. $\{a, \{a\}\} \in A$
g. $\{a, \{a\}\} \subseteq A$
h. $B \subseteq C$
i. $\{\{a\}\} \subseteq A$

A. True

B. True ✓

C. False, $\{a, \{a\}\}$ is not an element in A

D. True

E. True

F. False, there are 3 elements in A, none of which are $\{a, \{a\}\}$ ✓

G. True

H. False, the element a is not one of the two elements in C

I. True ✓

2. (4 pts) Find $\wp(\wp(S))$ for $S = \{a, b\}$.

$P(S) = \{\phi, \{a\}, \{b\}, \{a,b\}\}$ ✓

$P(P(S)) = \{ \phi,$

$\{\phi\}, \{\{a\}\}, \{\{b\}\}, \{\{a,b\}\},$

$\{\phi, \{a\}\}, \{\phi, \{b\}\}, \{\phi, \{a,b\}\}, \{\{a\}, \{b\}\}, \{\{a\}, \{a,b\}\}, \{\{b\}, \{a,b\}\},$

$\{\phi, \{a\}, \{b\}\}, \{\phi, \{a\}, \{a,b\}\}, \{\phi, \{b\}, \{a,b\}\}, \{\{a\}, \{b\}, \{a,b\}\},$

$\{\phi, \{a\}, \{b\}, \{a,b\}\} \}$

= ✓

2. (4 pts) Find $\wp(\wp(S))$ for $S = \{a, b\}$.

$\wp(S) = \{\{\}, \{a\}, \{b\}, \{a, b\}\}$ ✓

$\wp(\wp(S)) = \{\{\}, \{\{\}\}, \{\{a\}\}, \{\{b\}\}, \{\{a, b\}\}, \{\{\}, \{a\}\}, \{\{\}, \{b\}\}, \{\{\}, \{a, b\}\}, \{\{a\}, \{b\}\},$

$\{\{a\}, \{a, b\}\}, \{\{b\}, \{a, b\}\}, \{\{\}, \{a\}, \{b\}\}, \{\{\}, \{a\}, \{a, b\}\}, \{\{\}, \{b\}, \{a, b\}\}, \{\{a\}, \{b\}$

$\{a, b\}\}, \{\{\}, \{a\}, \{b\}, \{a, b\}\}\}$