1. **Given the sets $A = \{a, b, \{c\}, d, e, \{f\}\}$ and $B = \{1, 3, 5, \{7, 9\}\}$ state whether each statement is true or false.**

   a. $b \in A$

   b. $c \in A$

   c. $7, 9 \in B$

   d. $\{7, 9\} \in B$

   e. $a, b, d \in A$

   f. $\{a, b, d\} \in A$

   g. $1, 3, 5 \in A$

   h. $\{c\}, \{f\} \in A$

2. **Determine the cardinality of the following sets.** If it's finite, state a number. If it's infinite, say it's infinite.

   a. $\{x, y, z, w, v\}$

   b. $\{\{x, y, z\}, w, v\}$

   c. $\{1, 2, 3, ..., 99, 100\}$

   d. $\{1, \frac{1}{2}, \frac{1}{3}, \frac{1}{4}, ...\}$

   e. $\varnothing$

   f. $\{\varnothing, \varnothing\}$

   g. $\{\{a\}, a, a, a, a, \{a\}\}$

   h. $\{0, \{0\}, \{\{0\}\}, ...\}$

   Solutions are presented on the next page!

1. **Given the sets $A = \{a, b, \{c\}, d, e, \{f\}\}$ and $B = \{1, 3, 5, \{7, 9\}\}$ state whether each statement is true or false.**

   a. $b \in A$
      True.

   b. $c \in A$
      False. Only $\{c\}$ is an element of A.

   c. $7, 9 \in B$
      False. Neither are elements of B. $\{7\}$ and $\{9\}$ are elements of B.

   d. $\{7, 9\} \in B$
      True.

   e. $a, b, d \in A$
      True.

   f. $\{a, b, d\} \in A$
      False. $a, b, d \in A$, but not the set of all three.

   g. $1, 3, 5 \in A$
      False. These are elements of B.

   h. $\{c\}, \{f\} \in A$
      True.

2. **Determine the cardinality of the following sets.** If it's finite, state a number. If it's infinite, say it's infinite.

   a. $|\{x, y, z, w, v\}| = 5$

   b. $|\{\{x, y, z\}, w, v\}| = 3$

   c. $|\{1, 2, 3, ..., 99, 100\}| = 100$

   d. $|\{1, \frac{1}{2}, \frac{1}{3}, \frac{1}{4}, ...\}|$ is infinite.

   e. $|\varnothing| = 0$

   f. $|\{\varnothing, \varnothing\}| = 1$.
      Repeated elements do not count multiple times.

   g. $|\{\{a\}, a, a, a, a, \{a\}\}| = 2$.
      Repeated elements do not count multiple times.

   h. $|\{0, \{0\}, \{\{0\}\}, ...\}|$ is infinite.