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For each of the following problems, circle T if the statement is always true and F if the statement is sometimes false. There is no partial credit on this part of the quiz. For each of the following problems use the sets:

$$U = \{a, b, c, d, e, f, g\}$$

$$A = \{a, e\}$$

$$B = \{a, b, e, f, g\}$$

$$C = \{b, f, g\}$$

$$D = \{d, e\}$$

1. T          F           $C \subseteq U$

This is TRUE.  $U$  is the universal set and all other sets are subsets of  $U$ . Notice that you can also check that every element of  $C$  is also in  $U$ .

2. T          F           $D \subseteq B$

This is FALSE since the two elements (d and e) in  $D$  are not both elements of  $B$ .

3. T          F           $\emptyset \subseteq A$

This is TRUE. The empty set is a subset of every set.

4. T          F           $\emptyset \subseteq \emptyset$

This is TRUE. The empty set is a subset of every set, including itself.

5. T          F           $\emptyset \in U$

This is FALSE. The empty set is not a member of (or element of) the set  $U$ .

6. T          F           $\{b\} \subseteq C$

This is TRUE since  $b \in \{b\}$  and  $b \in C$  and there are no other elements to check.

7. T          F           $b \in C$

This is TRUE since  $b$  is one of the three elements listed in  $C$ .

Complete the following problem. Show all work, including an explanation, to receive full credit.

8. How much dirt is there in a cubical hole, 6 feet on each side?

There is no dirt in the hole. It is a hole, and so, by definition, empty.