Solution:
The text suggests both '2' and '1' base choices for side 1. (Other sides still have 1 base choice of '2'). This give two base tests: $(2, 2, 2)$ *and* $(1, 2, 2)$*. According to the formula given in the text, we get 2(base) + 4 + 6 + 6 = 18 tests. However, 2 of these are redundant, so the result is 16. To clarify, we list all 18 tests, generated according to the formula:*

$\{(2, 2, 2),$ $//First\ base\ test$

$(0, 2, 2), (-1, 2, 2),$ $//Vary\ first\ characteristic$
$(2, 1, 2), (2, 0, 2), (2, -1, 2),$ $//Vary\ second\ characteristic$
$(2, 2, 1), (2, 2, 0), (2, 2, -1),$ $//Vary\ third\ characteristic$

$\{(1, 2, 2),$ $//Second\ base\ test$
$(0, 2, 2), (-1, 2, 2),$ $//Vary\ first\ characteristic$
$(1, 1, 2), (1, 0, 2), (1, -1, 2),$ $//Vary\ second\ characteristic$
$(1, 2, 1), (1, 2, 0), (1, 2, -1),$ $//Vary\ third\ characteristic$
$\}$

Here are the 16 nonredundant tests:

$\{(2, 2, 2),$
$(0, 2, 2), (-1, 2, 2),$
$(2, 1, 2), (2, 0, 2), (2, -1, 2),$
$(2, 2, 1), (2, 2, 0), (2, 2, -1),$
$(1, 2, 2),$
$(1, 1, 2), (1, 0, 2), (1, -1, 2),$
$(1, 2, 1), (1, 2, 0), (1, 2, -1)$
$\}$

Thanks to Richard Carver for correcting this solution.

4. Answer the following questions for the method `intersection()` below:

```
public Set intersection (Set s1, Set s2)
   // Effects:   If s1 or s2 is null throw NullPointerException
   //    else return a (non null) Set equal to the intersection
   //    of Sets s1 and s2

   Characteristic:  Validity of s1
      - s1 = null
      - s1 = {}
      - s1 has at least one element

   Characteristic:  Relation between s1 and s2
      - s1 and s2 represent the same set
      - s1 is a subset of s2
      - s2 is a subset of s1
      - s1 and s2 do not have any elements in common
```

(a) Does the partition "Validity of s1" satisfy the completeness property? If not, give a value for $s1$ that does not fit in any block.

Solution (Instructor only):
Yes.

(b) Does the partition "Validity of s1" satisfy the disjointness property? If not, give a value for $s1$ that fits in more than one block.

Solution (Instructor only):
Yes.

(c) Does the partition "Relation between s1 and s2" satisfy the completeness property? If not, give a pair of values for $s1$ and $s2$ that does not fit in any block.

Solution (Instructor only):
No. Note that some sets have elements in common, but still do not satisfy any subset relationship. Example: `s1 =` $\{1, 2\}$`; s2 =` $\{1, 3\}$.

(d) Does the partition "Relation between s1 and s2" satisfy the disjointness property? If not, give a pair of values for $s1$ and $s2$ that fits in more than one block.

Solution (Instructor only):
No. Consider `s1` *and* `s2` *= the same set, such as* $\{1, 2\}$. *The predicates for each of the first three blocks are satisfied. Alternatively, consider* `s1` *and* `s2` = $\{\}$. *The predicate for every block is satisfied.*

(e) If the "Base Choice" criterion were applied to the two partitions (exactly as written), how many test requirements would result?

Solution (Instructor only):
There would be 1 (for the base test requirement) plus 2 (for first characteristic) plus 3 (for second characteristic) = 6 test requirements total.