

Name: _____

FORMAT

- Write neatly and clearly on white paper (lined or unlined)
- Attach a POW cover sheet to the front of your work for turn in

Before starting your problem solving process:

- ✓ Refer to your POW directions
- ✓ Read **all** of the directions given here

1. Use Polya's four-step problem solving process throughout. Clearly mark each of the four steps. You may combine the following into one problem. You do not have to distinguish the parts a – e.

a. **Bennett, Burton and Nelson: Puzzler §5.2**

After a cake has been cut into three equal pieces, as shown here, a hostess discovers that four people each want an equal share of the cake. How can she make one more straight cut so that each of the FOUR people gets the same amount of cake? Note: The WHOLE cake needs to be eaten.

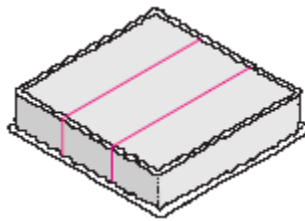


Figure 1

Using the same problem setup (cake initially cut as in Figure 1) for parts b – e:

- b. Suppose now that FIVE people want to equally share the cake. Can the hostess still make 1 straight cut? If not what is the least amount of cuts that she needs to make? Hint: four cuts are too many!
- c. Suppose now that SIX people want to equally share the cake. Can the hostess still make 1 straight cut? If not what is the least amount of cuts that she needs to make? Hint: five cuts are too many!
- d. Suppose now that n people want to equally share the cake where n is a multiple of 3, i.e. $n = 3, 6, 9, 12, \dots$ Can the hostess still make 1 straight cut? If not what is the least amount of cuts that she needs to make?
- e. Suppose now that n people want to equally share the cake where n is **not** a multiple of 3; i.e., $n = 7, 8, 10, 11, \dots$ Can the hostess still make 1 straight cut? If not what is the least amount of cuts that she needs to make?