Problem Solving

A Cat, a Parrot, and a Bag of Seed:

A man finds himself on a riverbank with a cat, a parrot and a bag of seed. He needs to transport all three to the other side of the river in his boat. However, the boat has room for only the man himself and one other item (either the cat, parrot or seed). In his absence, the cat could eat the goat, and the goat would eat the cabbage. Show how he can get all the passengers to the other side, without leaving the wrong ones alone together.

1. **Define the problem**:
   * The man’s problem is having enough space to transport his cat, parrot, and bag of seeds along with himself in the boat. We don’t know his intended use for the seeds, or animals. His over all goal is to get himself and his belongings to the other side.
2. **Break the problem apart**:
   * The boat only has room for himself and one of the three items. He must transport himself and all of his items to the other side.
3. **Identify potential solutions:**
   * He could feed the seeds to the bird, feed the bird to the cat, and carry the cat with him on the boat.
   * He could try to put the bid and cat inside the bag of seeds. This will allow him to carry only the bag on the boat.
   * Another option he has is to take each item over one at a time. He could have someone on each side watch the items as he makes the separate trips across the water.
4. **Evaluate each potential solution**:
   * The 1st option is destructive to both the seeds and bird.
   * The 2nd option has the same potential of being destructive to the bird and seeds. Once in the bag, the bird may be tempted to eat the seeds, just as the cat may be tempted to eat the bird.
   * Although the 3rd option requires multiple steps, it has the greatest chance for success. This can be done with the assistance of a helper on each side to watch his items.

Socks in the Dark:

There are 20 socks in a drawer: 5 pairs of black socks, 3 pairs of brown and 2 pairs of white. You select the socks in the dark and can check them only after a selection has been made. What is the smallest number of socks you need to select to guarantee getting the following:

a) At least one matching pair

b) At least one matching pair of each color.

Predicting Fingers:

A little girl counts using the fingers of her left hand as follows:

She starts by calling her thumb 1, the first finger 2, middle finder 3, ring finger 4, and little finger 5. Then she reverses direction, calling the ring finger 6, middle finger 7, first finger 8 and thumb 9, after which she calls her first finger 10 and so on. If she continues to count in this manner, on which finger will she stop?

a) What if the girl counts from 1 to 10

b) What if the girl counts from 1 to 100

c) What if the girl counts from 1 to 1000