Problem 1:

1. The problem with this is that the man is on a riverbank. He has a cat, a parrot, and a bad of seeds. He needs to get everything, including himself to the other side using his boat. The boat, unfortunately, only has room for himself and one of either the cat, parrot, or seeds. If he takes one of the passengers across, there is a chance that the other passengers will eat each other. Also, we cant forget what will happen when he leaves the passengers to go pick up the last passenger. We need to figure out a way across without everyone eating everything.
2. The constraints are one boat that can fit the man and one passenger, the fact that the cat will eat the parrot if left alone and the parrot would eat the seeds if left alone. The man needs to get each passenger across without having to worry about the others being eaten. Also making sure that once he has taken two passengers over that one doesn’t eat the other.
3. A possible solution is leaving the cat and the seed alone and taking the bird first leaving the cat and the seeds, which will not interact. Then go back and get the seeds. Once you reach the other side with the bird, I would burry the seeds so the bird cannot eat it. Then go back and get the cat. At that point, once all three passengers are over. I would dig up the seeds and be on my way.
4. The solution does meet my goal and I imagine it would meet any scenario with a similar problem.
5. Look at number 3

Problem 2:

1. The problem with this is that with 20 socks in the drawer, I need to be able to make pairs of matching socks in the dark so I am not able to look at the socks. How many attempts will it take me to find the pair of socks that match both in a single color, and one of each color. How many combinations can there be?
2. There are 3 different colored socks. 5 pairs of black socks, 3 pairs of brown socks, and 2 pairs of white socks. I am in the dark so I cannot see. I can only look at the socks after I have decided which 2 I pick. I need to figure out how many attempts it will take me to get a pair of socks
3. The solution is that it will only take a maximum of two tries to get a pair of socks. And it will take a maximum of 9 tries to get a pair of all three colored socks.
4. Each solution does meet the goal. And yes they will work for all similar problems.
5. For finding one matching pair of socks all you have to do is pull out 2 socks. For arguments sake, lets say it is black and brown. Then no matter what 2 socks you pull out next, you will have a matching pair. Whether it is black and brown, or brown and white, or black and white, you end up with a pair of matching black or brown socks. For the other problem of getting a pair of matching socks of each color, it take maximum attemps. For arguments sake again, lets say you pull out a black sock and a brown sock 6 times in a row, then after that you pull out 2 black socks 2 times in a row. This would leave the 9th attempt with only the white socks left leaving it impossible not to pick 2 white socks leaving you with a pair of all colored socks.

Problem 3:

1. A little girl is counting her finger in an odd way that changes which finger a number would land on every 10 digits instead of landing always on the same finger every time. I need to come up with a way of figuring out what finger 10, 100, and 1000 will land on without actually counting it myself.
2. The constraints are the way that the girl is counting the numbers on her hands.
3. I figured out that for 10 it ends on the first finger and after that it trades off with the ring finger for every 20 after that. Using that math They switch off every 100 as well. So 10 ends on the first finger, 100 ends on the ring finger, and 1000 ends on the first finger.
4. Yes, this solution meets the goals and does work for ALL cases.
5. Look at number 3