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Problem Solving

WPF section 1

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 parrot, and the parrot would eat the bag of seed. Show how he can get all the passengers to the other side, without leaving the wrong ones alone together.

For this question I will break it down into cat=A, parrot=B, and seed=c. the question is how to move ABC one by one without leaving A/B or B/C alone. With seeing that B is the letter that cannot be left alone with A or C we can come to the conclusion that B will be the first to move. After moving B we then will return to object A and C. The next problem will be that if I take A or C and return to pick up the last A or C will be left with B. If after moving A or C I also move object B back to the original position I can then move A or B depending on which I choose I can then move all objects without having B interact with A or C. After moving B I will now move object C. After moving C I will move object B back to the original position. I will now move object A to the new position. Leaving A and C together I will return to the original position and now move object B for the last time solving the problem.

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.*

The next question is asking if you have ten black socks=A, six brown socks=B, and four white socks=C what is the minimum selections needed to guarantee get matching socks. I can pick one at a time but can only see my selection after it has been chosen.

If I need to get one pair of matching sock what is the minimum number of selections needed. This answer will change according to the first selection. Do to the varying numerical value of A, B, and C the answer will vary accordingly. This answer will have to broken down into three parts.

If the first selection is C we will have the numerical value of four. With the total number being twenty what will be the minimum number of selections needed?

20-4=16 but if we need two C’s to get our pair we will have to add two to the answer.

20-4+2=18

Using the same thinking but changing the first selection to B what will be the answer?

20-6+2=16

Using the same thinking but changing the first selection to A what will be the answer?

20-10+2=12

All that being said the most correct answer to what is the minimum number of selections needed to guarantee a match is 12.

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 finger 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

For this question thumb=A, first finger=B, middle finger=C, ring finger=D, little finger=E. In the question the first time around counting to ten A=1, B=2, C=3, D=4, E=5, D=6, C=7, B=8, A=9, and B=10. This is a very time consuming way of solving the problem. I will have to find a mathematical formula for solving the problem as a whole.

After the first time around we can see that counting to ten will = B, but when you continue with this thinking twenty would = D. Based on this information what would be the formula to solve the problems?

Clearly, when we count A will be 1, 9, 17, and 25…

What we see is the common factor being a difference of 8. That being said can divide any number by 8 subtract the remainder multiply by 8 and subtract that number from the total, and get the answer as it correlates to the number.

The formula for this would be 8x +1

Based on this if the girl counted to ten the answer would be C.

10/8=1.25 1.25-.25=1 1\*8=8 8+2=10

Since A = 8x +1 the answer would be C

If the girl counts to ten she will end on C.

So, if the girl counted to one hundred we would just

100/8= 12.5 12.5-.5=12 12\*8= 96 96+4=100

Giving us an answer of D.

So, if the girl counted to one thousand we would just

1000/8=125 125\*8=1000 giving us an answer of B.