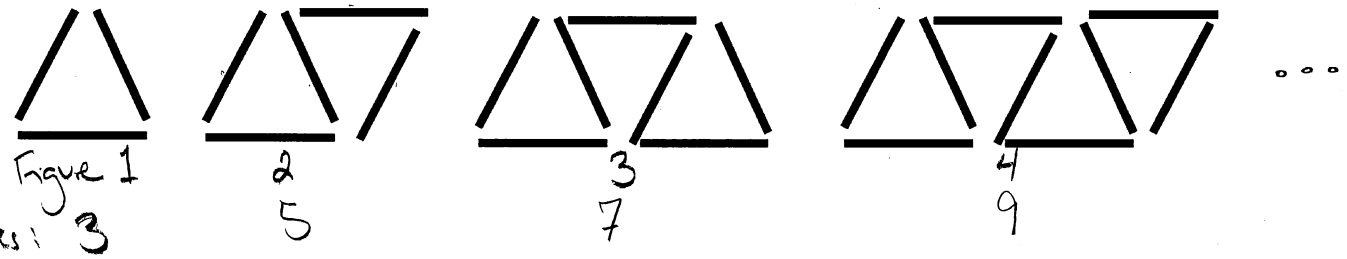
Example Solutions

Problem Solving

While working in a group make sure you:

- Expect to make mistakes but be sure to reflect/learn from them!
- Are civil and are aware of your impact on others.
- Assume and engage with the strongest argument while assuming best intent.

1. Ryan is building a toothpick sequence as shown below. He used 69 toothpicks in the last figure, how many toothpick are needed for the entire project?



# of toothpicks: 3, 5, 7, 9

Pattern... it look like we are going up by 2 each time

We want to know the total # of toothpicks so

$3+5+7+9+11+\dots+65+67+69$

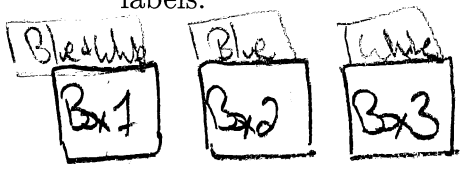
$72+72+72+\dots+72 = 1224$

17 of these

(looks like up to Figure 34)

Figure	1	2	3	4	5	...
toth	3	5	7	9	11	

2. Find the Right Labels: There are three boxes with different colored chips in them. One box has only blue, one box has only white, and the last box has blue and white. Each label is incorrect. Determine the correct placement of the labels you may draw ONLY one chip from one box. From that, determine the correct placement of all the labels.



Lets call the box with the "Blue and White" label Box 1. Lets call the box with "Blue" Box 2 and Box 3 originally has "White" label.

We draw 1 chip from Box 1 (originally labeled Blue & White)
Since the labels are wrong, we know this box should have a dif. label.

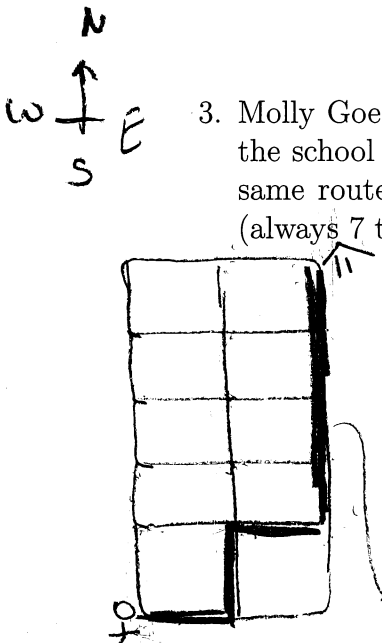
Case 1: We draw a blue chip

Box 2's label "Blue" and put on Box 1.
If "Blue & White" label was to Box 2, then Box 3's label would not have been switched!
Thus we need "Blue & White" to go to Box 3 & "White" to box 2.

Case 2: We draw a white chip.
↓ The same reasoning holds here as Case 1. Now Box 1 is "White", Box 3 will have "Blue" and Box 2 will have "Blue & White"

3. Molly Goes to School: Molly is trying to get to school. She lives five blocks south of the school and two blocks west (see the diagram). Molly gets bored easily taking the same route to school. Determine if it is possible for Molly to take a different route (always 7 total blocks) to school every day for 4 weeks assume a normal school week.

Yes



lines are streets
are there 4.5=20 distinct paths along the streets that are only 7 blocks long?
↑N are block →E are block.
We will list the possibilities

WWNNNNN
WNWNNNW
WNNWNNW
WNNNWNW
WNNNNWW
NWWNNNW
NWNWNNW

NWNNWNN
NWNNNWN
NWNNNNW
NNWWNNN
NNWNWNN
NNWNNWN
NNWNNNW
NNWWWNN

21 paths listed

4. Magic Squares: Arrange the numbers 1 through 9 into a 3 by 3 grid so that the sum of every row, column, and main diagonal is the same.

NNNWWNW
NNNWWNW
NNNNWWN
NNNNNWW
NNNNNWW

5. Remove the two diagonally opposed corners of a checkers board. Given a set of dominoes such that each domino can cover two adjacent squares on the board, can the dominoes cover the board with no dominoes hanging off?