FINDING A PATTERN

PROBLEM 1:

- **Find the sum of the first 50 odd numbers?**

STEP 1:Understand the problem

- **The problem asks us what is the solution if we sum the first 50 odd numbers.**

STEP 2:Making a Plan

- **You can use *Finding a Pattern Strategy* while solving this problem.**
- **Try to find a pattern.**

STEP 3:Carry Out the Plan

- **Examine this problem by looking for a pattern.**

Addends	Number of Addends	Sum
1	1	1
1+3	2	4
1+3+5	3	9
1+3+5+7	4	16
1+3+5+7+9	5	25
1+3+5+7+9+11	6	36
.	.	.
.	.	.

Carry Out the Plan

- **The table shows us there is a relation between the sum and the number of addends.**
- **It is clearly seen that the sum of the first *n* odd numbers is n^2 .**
- **In this problem *n(number of addends)=50***
- **The answer is $50^2=2500$**

STEP 4: Check the Solution

- **Another method rather than *Finding a Pattern:***

  You can solve this problem by writing out all of the odd numbers from 1 through 59 and adding them.

1 + 3 + 5 + 7 + 9 +.....+ 91+93+95+97+99

+ 99+97+95+93+91+.....+9+ 7 + 5 + 3 + 1

100+100+100+100+100+.....+100+100+100+100

100*50/2 = 2500 (2 times the sum of the first 50 odd numbers)

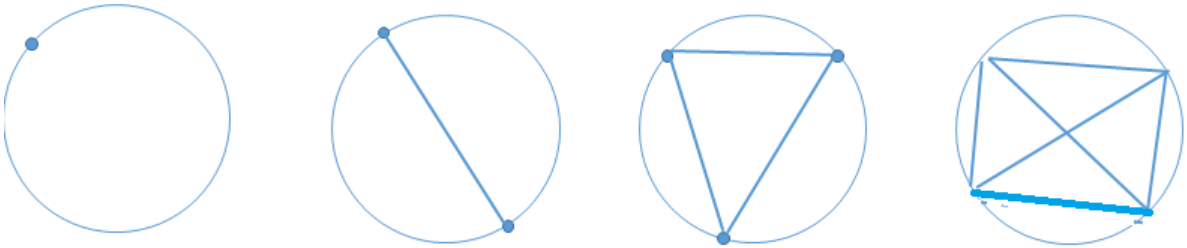
So divide 5000 to 2 to find the solution.

5000 / 2 = 2500

STEP 5 : Extend the Problem

- **Find the sum of the first 200 even numbers.**

PROBLEM 2



I. Step II. Step III. Step IV. Step

In the figure above, we choose point(s) on a circle and connect them to form distinct, no overlapping regions.

What is number of regions obtained by connecting n-points?

UNDERSTAND THE PROBLEM:

What is given?

- If there is 1 point on the circle, this point divides the circle to the one region.
- If there are 2 points on the circle, these points divide the circle to no overlapping 2 regions.
- If there are 3 points on the circle, these points divide the circle to no overlapping 4 regions.
- If there are 4 points on the circle, these points divide the circle to no overlapping 8 regions.

What is asked?

- What is number of regions obtained by connecting n points?

MAKE A PLAN:

- We can use “Finding a Pattern Strategy”
- By starting to construct a table showing number of points and maximum number of regions to recognize a pattern.

CARRY OUT THE PLAN:

Number of points	1	2	3	4	5	....	n
Max number of regions	1	2	4	8			?

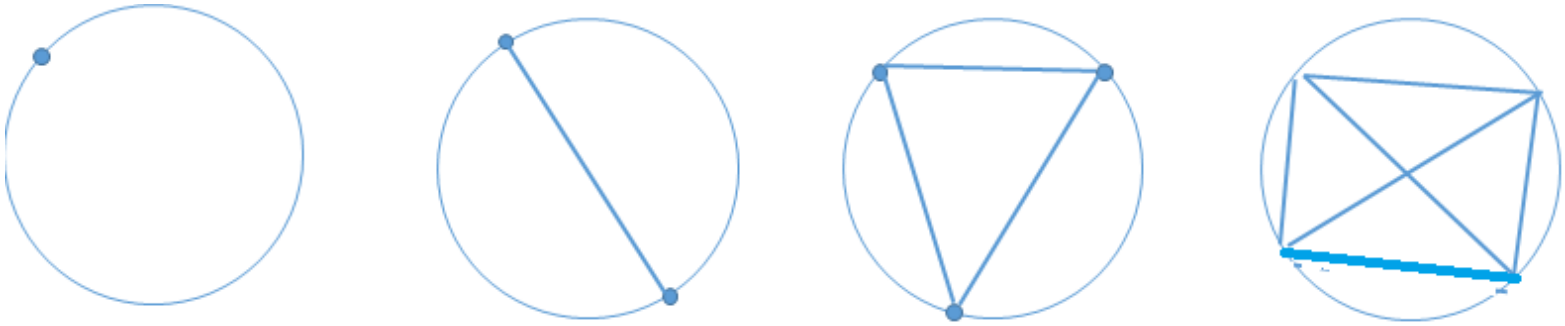
2^{n-1} ????? for n points

Check/Look Back

- **n= 6 number of regions:31**
- **n=6 ise $2^{n-1} = 2^5 = 32$????**

- **Number of Regions for n Points=1/24 ($n^4-6n^3+23n^2-18n+24$)**

EXTENSION



In the figure above, we choose point(s) on a circle and connect them to form distinct, no overlapping regions.

Is tthere any relationship between number of lines obtained by connecting n-points and regions obtained by line segments/chords?

REFERENCES

- http://www.teachervision.fen.com/problem-solving/teaching-methods/48900.html
- *www.eduplace.com/math/mw/practice/3/problems/15_5.pdf*
- http://www.nzetc.org/tm/scholarly/name-411876.html
- **http://mathforum.org/library/topics/problem_solving/**