

Corrections on Circle-Crossing Game

1 Overview

1. Under your name you should have
Mentor: William Gasarch
2. The Overview. This is not a *what I did this summer* essay. You don't need to talk about me or the group.
3. You say you worked with two other people. Should they be on the paper as authors also? Are they writing separate papers?
4. The entire Overview can be deleted. Everything you say in it is either un-needed or is said in the next section.

2 The Circle-Crossing Game

1. You should begin as follows, which is very close to what you already do.

In this paper we will study the Circle-Crossing Game which we describe.

The Circle-Crossing Game Let $n \geq 4$. n points are placed on a circle. The players are Player One and Player Two. Player One goes first. In Players turn they draw a chord between two points (where there has not already been a line). The first Player who draws a cord that intersects with an existing cord loses.

2. The paragraph *When we first started...* can be omitted. Instead be shorter and to the point:

Two questions arise

1) For which n does Player One win? For which n does Player Two win?

2) For the winning player, what is the winning strategy.

We have proven the following:

Theorem Let $n \geq 4$. Player One has a winning strategy. It is very simple: in every turn draw a line between two chords that does not intersect another chord.

3. The statement

a triangulation for a convex n -gon ...

should be a lemma. Use this format:

Lemma STATE IT

Proof:

PUT IN THE PROOF

End of Proof

THEN restate the theorem and prove it, same format.

4. You use the word *minus*. Instead use the math, e.g., $n - 2$.
5. The last paragraph of this section you discuss $n = 3$. Note that one of my corrections was to DEFINED the game only for $n \geq 4$. You should do that and then omit the paragraph about $n = 3$.

3 Computational Verification

You should say why you stopped at 9. Was 10 too much for your computer to handle?

4 Reflection

You say:

It looks like the simplest game out of everything the group studied, points and chords and nothing else, and it turned out to have the cleanest most complete answer of all of them.

Your point is that you can't tell how hard a problem will be ahead of time. This is a good point to make. But I don't think you quite make that point since

cleanest and most complete answer is not equivalent to hard or complicated.

I think you mean something like this:

It looks like the simplest game out of everything the group studied, points and chords and nothing else. In one sense it was simple: Player One wins so long as he does not make a bad move. But in another sense it was complicated: proving this required learning some new math and also very subtle reasoning and getting the math just right.

This reflection is GOOD to leave in the version of the paper that I read since I am happy to know all of this.

My letter for you will point to this paper, and that version SHOULD have the reflection in it.

If you submit this as a HS project or a Science fair competition, you will need to remove this part.

5 Acknowledgement

You should name the people who helped you, rather than just say *the research assistants*.