

Yielding the Floor: Student-Driven Math Circles

Sam Vandervelde

ST. LAWRENCE UNIVERSITY

January 8, 2011

Math Circle Styles

Modes of student involvement

- **Good:** Interested (math talk format)

Math Circle Styles



Math Circle Styles

Modes of student involvement

- **Good:** Interested (math talk format)
- **Better:** Engaged (math class format)

Math Circle Styles



Sam Vandervelde

Yielding the Floor

Math Circle Styles

Modes of student involvement

- **Good:** Interested (math talk format)
- **Better:** Engaged (math class format)
- **Best:** Engrossed (math circle format)

Math Circle Styles



Math Circle Styles

Modes of student involvement

- **Good:** Interested (math talk format)
- **Better:** Engaged (math class format)
- **Best:** Engrossed (math circle format)
- **Not good:** Out of control

Math Circle Styles



Math Circle Styles

Modes of student involvement

- **Good:** Interested (math talk format)
- **Better:** Engaged (math class format)
- **Best:** Engrossed (math circle format)
- **Not good:** Out of control
- **Very bad:** Bored stiff

Math Circle Styles



Sam Vandervelde

Yielding the Floor



Why Yield the Floor?

Theorem

In order to have a truly meaningful math circle experience, students must be given the opportunity to conduct mathematical research, at an appropriate level and scope.

How to Yield the Floor?

Means of providing students with a truly meaningful math circle experience:

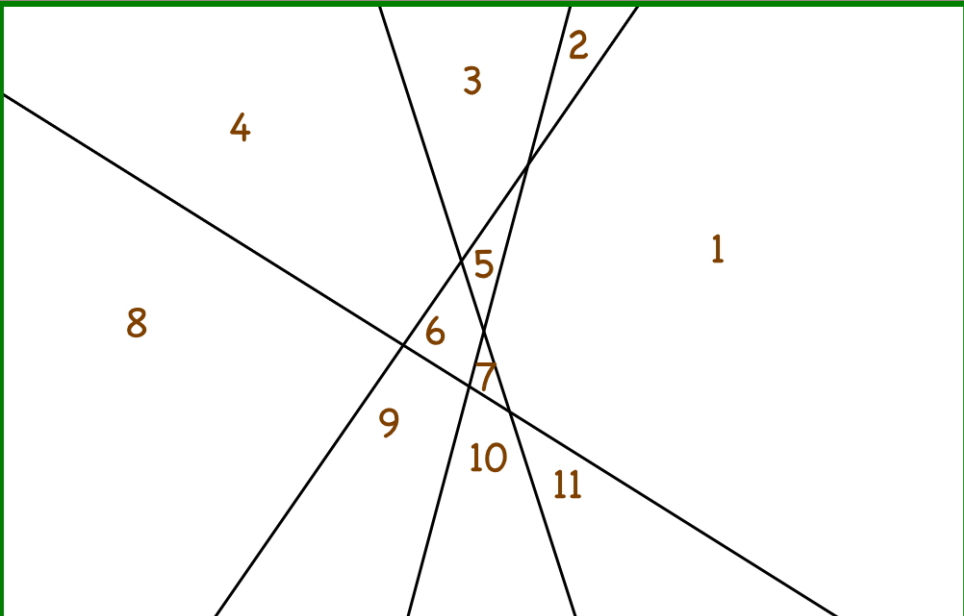
- Select topics for “research potential”
- Invite students to ask questions
- Allow time for “getting nowhere”
- Choose room and format strategically

How Many Regions?

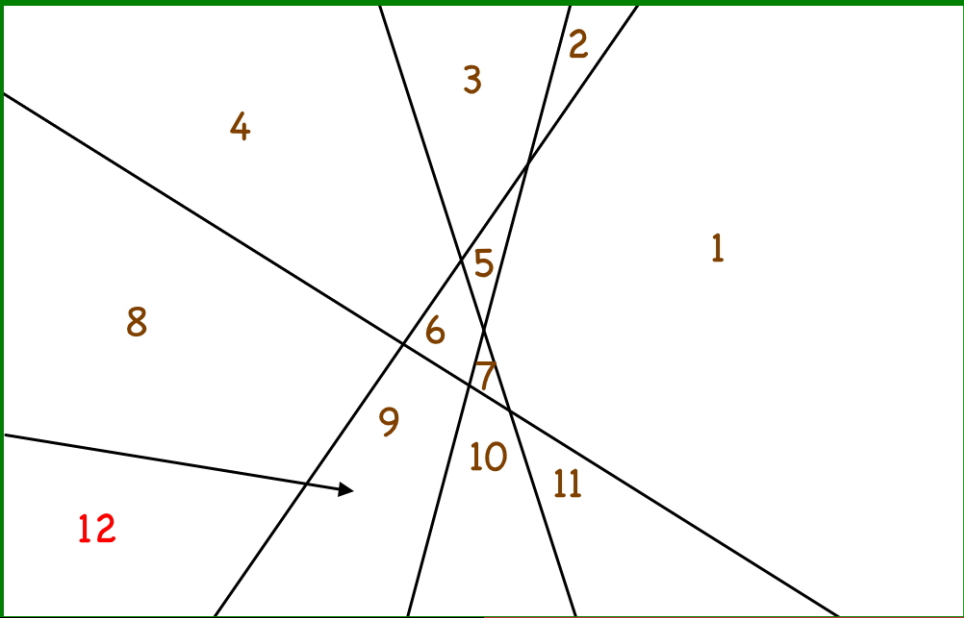
A promising topic—counting the number of regions into which n lines divide the plane.

- **Good:** Give a riveting presentation

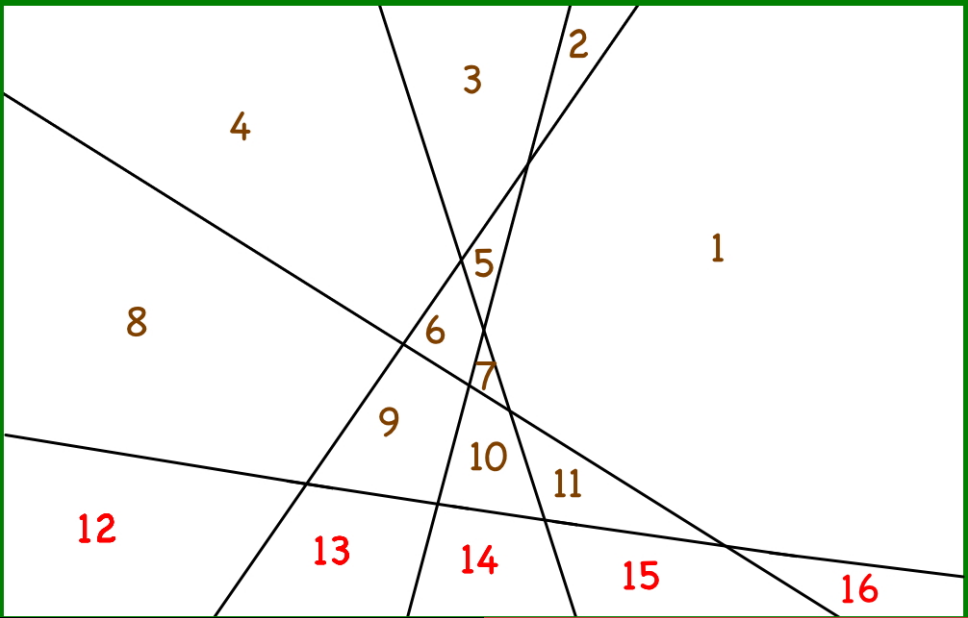
How Many Regions?



How Many Regions?



How Many Regions?



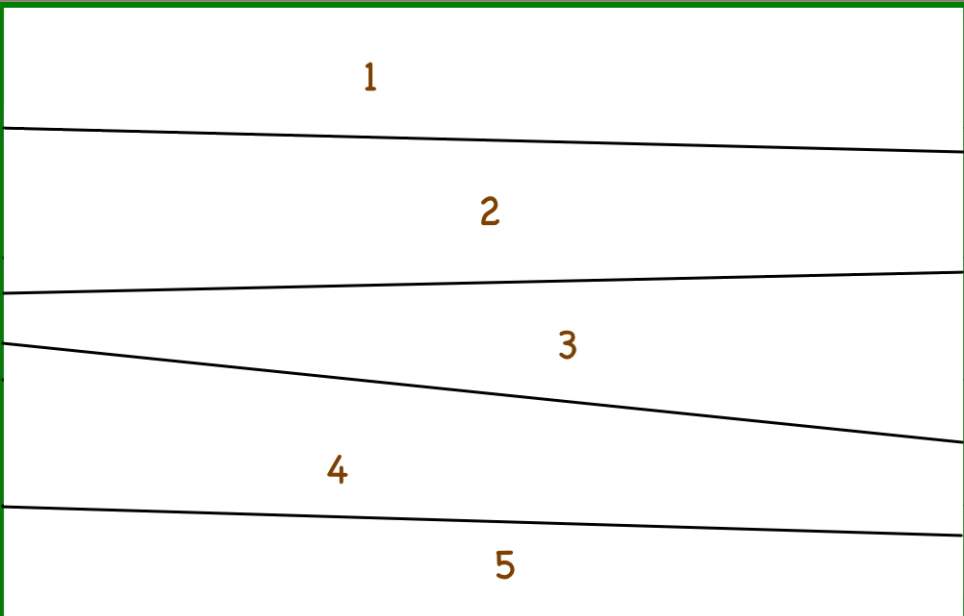
How Many Regions?

A promising topic—counting the number of regions into which n lines divide the plane.

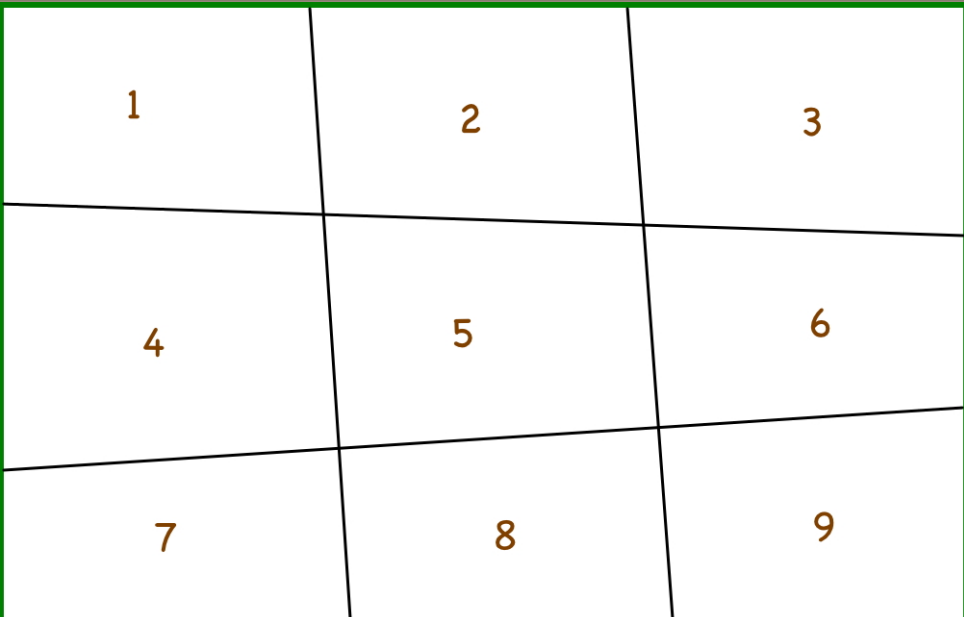
- **Good:** Give a riveting presentation
- **Better:** Have students provide data
- **Best:** Ask a thoughtful question

“If you draw four (straight) lines on a sheet of paper, how many regions would you get?”

How Many Regions?



How Many Regions?



Promoting Research

A promising topic: Pick's Theorem

- 1 Hand out sheets of paper with a rectangular lattice of dots.
- 2 Work through a few examples finding areas of lattice polygons.
- 3 Challenge students to create “wierd” polygons of area five.
- 4 Compare results, make observations, ask questions

Who knows, perhaps it will occur to a student to consider interior points and boundary points!

Promoting Research

A promising topic: Chessboard Puzzle

- 1 Hand out sheets of paper with several 6×6 boards.
- 2 Instruct students to put X's through any two squares.
- 3 Challenge them to tile the remainder with dominoes.
- 4 Compare results, make conjectures, reveal coloring.

A fifth grader in my math circle demonstrated to the rest of us how to predict whether a tiling was possible or not.

Thanks For Listening!

Best wishes for leading marvelous math circles in the upcoming year.

And now I will take my own advice and

YIELD THE FLOOR.