Rutgers University Math Teachers' Circle (Busch campus)

April 15, 2015

Icebreaker

Discussion topic (whole class):

- Do you use pattern blocks in your classroom and if so, in what ways?

Activity:

- Take a minute to write a few observations about the pattern blocks (individually). Then share your observations with your group mates and compare.

- As a group, formulate one or two interesting or challenging questions about pattern blocks that you think other teachers would enjoy thinking about.

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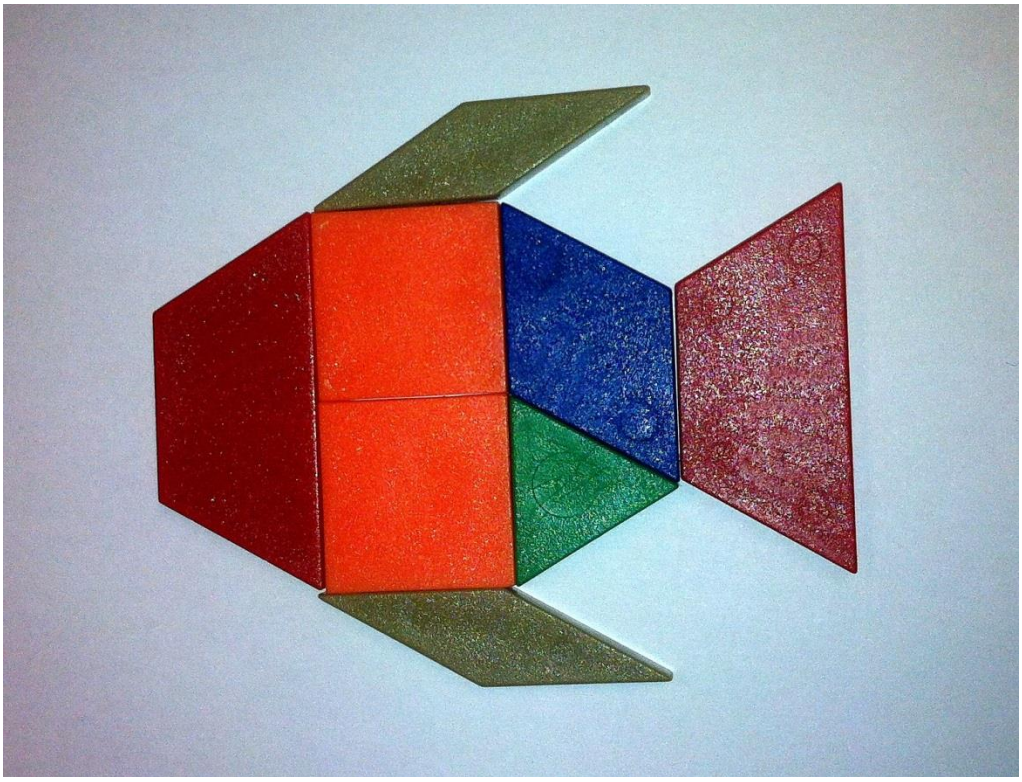
Main activity

Recall: a polygonal region is the region inside a polygon.

Part A. Assuming that the area of the green triangle in the figure below is 1 square unit, find an approximation for the area and perimeter of the polygonal region in the figure.



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Part B. Using only pattern blocks, can you build

(1) a polygonal region with 7 vertices?

(2) a polygonal region with 8 vertices?

(3) a convex polygonal region with 8 vertices?

(4) a polygonal region with two reflex interior angles? (A reflex angle is an angle whose measure is more than 180 degrees)

(5) Is there any number of vertices for which one cannot build an associated polygonal region using only pattern blocks?

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Part C.

(1) Discuss and agree on approximations for the interior angle measures of each type of block.

(2) Make a polygonal region with an interior angle of 330 degrees and an exterior angle of 30 degrees.

(3) Is it a convex region? If yes, explain why. If not, how many additional pattern blocks do you need to make it convex? (Possibly by changing the measures of the interior and exterior angles.) How many vertices does the new polygonal region have?

(4) Using only pattern blocks, can you make a polygonal region with an interior angle measuring more than 330 degrees?

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Additional problems

- Using only pattern blocks (and assuming that the side of the square is 1 unit):

  1) Make a polygon of perimeter 8 units

  2) Can you make a polygon of perimeter 8 units whose area is greater than that of the polygon you created for part 1)?

  3) Can you make a polygon of perimeter 8 units whose area is smaller than that of the polygon you created for part 1)?

- Can you make a convex polygonal region with 7 vertices?