LAUNCH:

Here are two fields entirely enclosed by fences. You have to check the fences to see if they are in good repair.

Field A

Field B

1. Which field has more acreage? **Field A**
2. Which field has more fence for you to check? **Field B**

8.4 Getting Started

Objective:
Find grid polygons with a given area or perimeter.

For You to Explore

1. Use only the grid lines on a sheet of graph paper. Draw several polygons with area 8 square units. Find the perimeter of each one. What are the greatest and least possible perimeters for grid polygons of this area?

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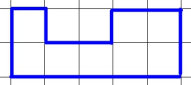
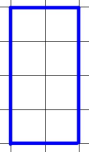
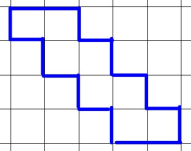
One example:



Least Perimeter: 12 units

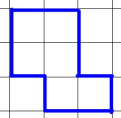


Greatest Perimeter: 18 units

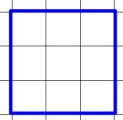


2. Use only the grid lines on a sheet of graph paper. Draw several polygons with perimeter 12 units. Find the area of each one. What are the greatest and least possible areas for grid polygons of this perimeter?

One example:



Greatest Area: 9 units^2



Least Area: 5 units^2

On Your Own

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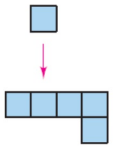
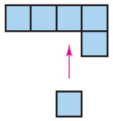
6. Each of the following grid polygons is changing. One square unit of area will be added to the polygon in the location shown. Find the perimeter and area for both the original and the new polygon.

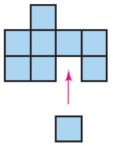
a.



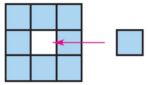
b.



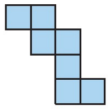
c.



d.



7. Change this grid polygon by adding as many square units to the polygon as you can without changing its perimeter. Show each step you take and check that the perimeter is unchanged. What is the greatest area you can get?



12. Find four polygons with area 12 square units. Each must meet one of the following criteria.

- It is a grid polygon that has maximum perimeter.
- It is a grid polygon that has minimum perimeter.
- It is a polygon of any type that has a greater perimeter than the maximum for grid polygons. (This polygon is not restricted to grid lines on graph paper.)
- It is a polygon of any type that has a perimeter less than the minimum for grid polygons.