

'Creating Measures' Compact-ness Task - Example #3

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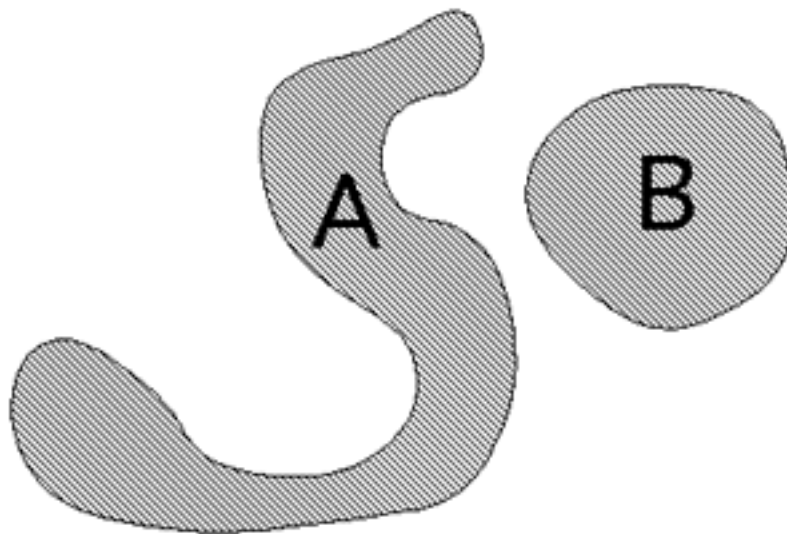
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This problem gives you the chance to:

- criticise a given measure for the concept of "compact-ness"
- invent your own way of measuring this concept
- refine your scale so that it measures from 0 to 1.

Over recent years, a number of geographers have tried to find ways of defining the shape of an area. In particular, they have tried to devise a measure of 'compactness'. You probably have some intuitive idea of what "compact" means already. Below are two islands. Island B is more compact than island A. "Compact-ness" has nothing to do with the size of the island. You can have small, compact islands and large compact islands.



Warm-up

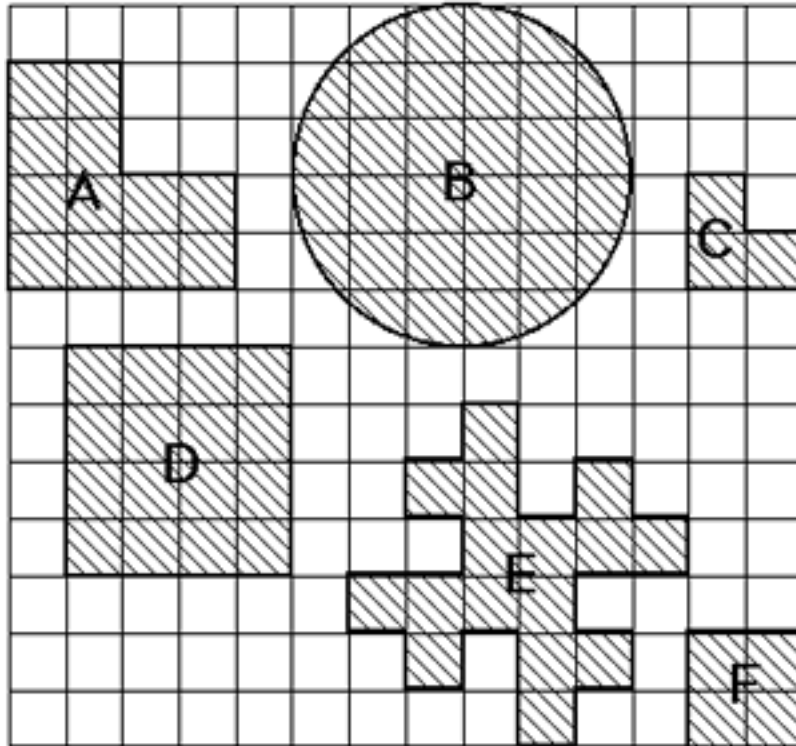
Sketch a large 'compact' island and a small 'compact' island.
Sketch a large 'less-compact' island and a small 'less-compact' island.

One person has suggested the following way of measuring "compactness."

We could say that a shape is more "compact" if it has a smaller perimeter for a given area. A good measure of compactness might be:
Compactness = Area ÷ Perimeter.



1. Calculate the "compactness" of each of the following 'islands' using the above definition.



2. Use your results to explain why **Area ÷ Perimeter** is **not** a suitable definition for "compactness."
3. Invent your own measure of "compactness". Put the shapes A to F in order of "compact-ness" using your measure. Discuss whether or not your measure is better than 'Area ÷ Perimeter.'

4. Adapt your measure so that it ranges from 0 to 1.
A perfectly compact shape should have a measure of '1,' while a long, thin, shape should have should have a measure near to 0.