

Intermediate Math Circles

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SHELDON'S SHELLS

The Centre for Education in Mathematics and Computing
Faculty of Mathematics, University of Waterloo

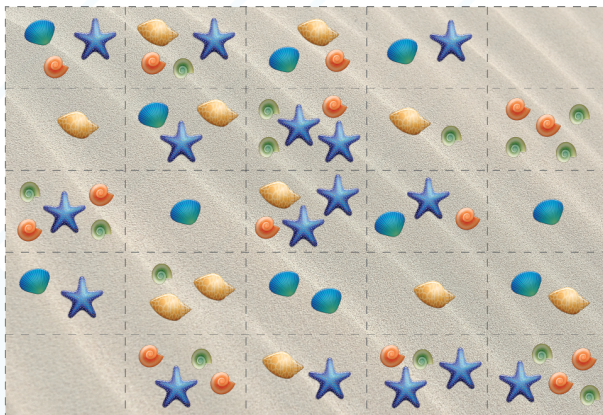
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Sheldon's Shells

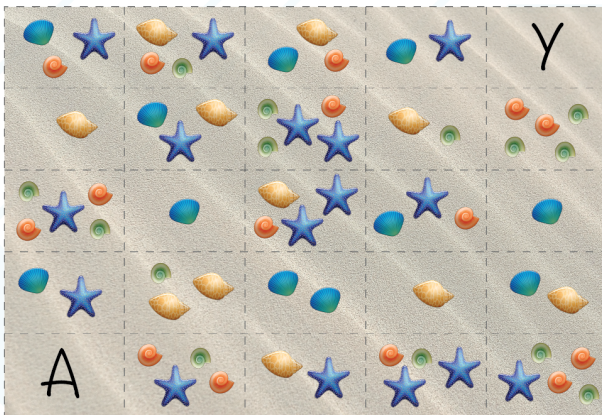
Sheldon is walking across the beach collecting shells.

The shells are scattered across the beach in different areas as shown:



Sheldon's Shells

Sheldon starts in the area marked *A* and ends in the area marked *Y*. After collecting all of the shells in an area he either moves up or moves right to a new area. **He never moves left or down.**



Problem Set

1. There are three different paths that Sheldon could take from A to the area located one up and two to the right of A (containing two blue shells). What are these three paths? For each of these three paths, how many shells will Sheldon collect, including the two blue shells?
2. Suppose Sheldon walks from A to Y by strictly following the edges of the beach. What is the maximum number of shells that Sheldon could collect?
3. While walking from A to Y , Sheldon stops part way and notices that he has collected exactly 8 shells so far, including the shells in the area in which he has stopped. Identify all the possible areas in which Sheldon may have stopped.
4. How many possible paths could Sheldon take from A to Y ?
5. What is the maximum number of shells that Sheldon could collect while walking from A to Y ?

