Pita form: perimeter halving on convex 2D body
- as performed in L17, but can be smooth

Alexandrov-Pogorelov Theorem: [1950/1973]
every convex metric, topologically a sphere, is realized as the surface of a unique convex 3D body \( \approx \) BEYOND POLYHEDRA
- proof by limiting argument + Alexandrov

D-form: glue together 2 convex 2D bodies of equal perimeter developable, from a dream... [Tony Wills]

Seam form: glue together 2D bodies to satisfy Alexandrov-Pogorelov
- properties:
  1. convex hull of seams
  2. creases (other than seams) are line segments with endpoints at (strict) vertices or tangent to seams impossible if 2D bodies convex

\( \Rightarrow \) D-forms have no seams & pita forms have \( \leq 1 \) crease, seam endpoints
LET'S MAKE SOME D-FORMS!

Proof of (1):
- Minkowski's Theorem: any convex body is the convex hull of its extreme points. A tangent plane hits just the point.
- Extreme point can't be locally flat AND convex.
- Curvature = area of tangent normals on Gauss sphere
  ⇒ positive at extreme point of convex body.

Proof of (2):
- Locally flat crease point has range of tangent planes between two extremes.
- Point can't be extreme by (1).
⇒ All tangent planes hit surface
⇒ Surface continues along line of intersection, remaining a crease by tangent planes, until not locally flat.
- If an endpoint is not a vertex, still zero curvature
⇒ Must be tangent to seam or else get third normal direction ⇒ Gauss area > 0.

qed.
- Rolling belt: half way
  (just like a convex body)

- to work:

- Alexandrov implementation

- Folding nonconvex polyhedra: (see O’Rourke 2010 & Spring 2005)
  > genus-Ø case

  **Burago-Zalgaller Theorem:** [1960; 1996]
  every polyhedral metric has an isometric polyhedral realization in 3D,
  noncrossing if metric is orientable or has boundary
  
  - uses Nash’s “spiraling perturbations”
  - is “strongly corrugated”
  - finite # polygons ... but no bound known

  **OPEN:** algorithm to find realization?