

摺紙, 剪紙 與 多邊形的學習

樹老師 2022/02/18

四邊形

圖形分割 與 拼砌

對稱

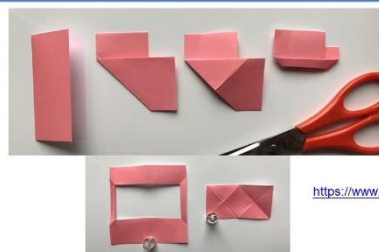
「剪一刀」的摺/剪紙探究

怎樣用「剪一刀」的方法得出

- 正方形, 菱形?
- 長方形?
- 其他四邊形?
- 正六邊形?
- 正五邊形?
- 五角星?
- 等邊三角形?

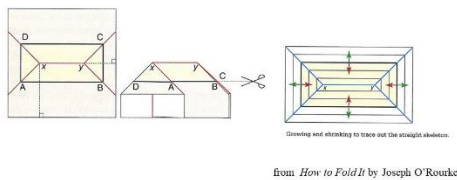
數學字典
 mathematics dictionary for kids <http://www.amathsdictionaryforkids.com/>
 wolfram mathworld <https://mathworld.wolfram.com/>

長方形

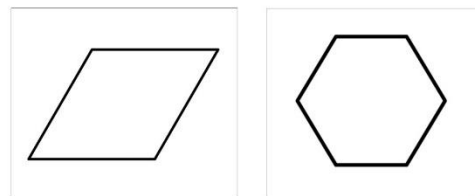


<https://www.geogebra.org/m/jeahbue5>

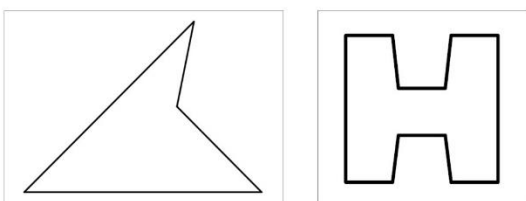
'Growing and Shrinking' techniques



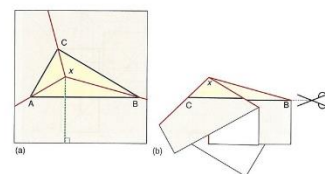
多邊形



多邊形



角平分線 angle bisectors



from *How to Fold It* by Joseph O'Rourke

Fold and One-Cut Theorem

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5.2 Fold and One-Cut Theorem

I hope you are now prepared to at least believe that the fold and one-cut theorem might be true. Here it is:

Theorem 5.1 (Fold and One-Cut)

Any straight-line drawing (one composed of straight segments) on a sheet of paper may be folded flat so that one straight scissors cut completely through the folding cuts all the segments of the drawing and nothing else.

from *How to Fold It* by Joseph O'Rourke

Erik Demaine - MIT lecture video

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Handwritten notes, page 1.8 • (version: paper) • (last: none) • (PDF)

Video ID: 1.13.13.11

G.849 Lecture 7 Sept. 29, 2010

Fold & one-cut:

- ① fold flat
- ② make one complete straight cut
- ③ unfold

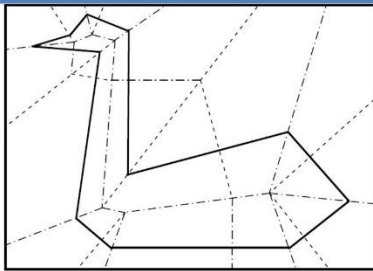
— what shapes/patterns of cuts are possible?

History: Kan Ono (1921) — Japanese puzzle book
 Betty Ross (1933 obj) — 1st in American flag
 Harry Heilbrunn (1942) — 1st in paper airplane
 Gerald Love (1952) — paper cubes — rough skills
 Martin Gardner (1962) — Scientific America — 2nd

source: <https://courses.cornell.edu/6.849/fall10/lectures/1.07.html>

'straight skeleton' method

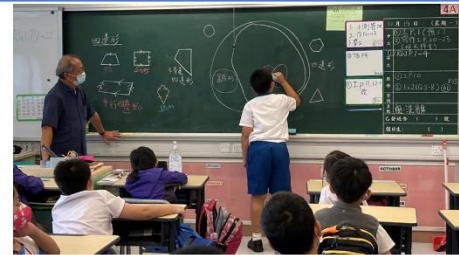
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By Erik Demaine

四邊形

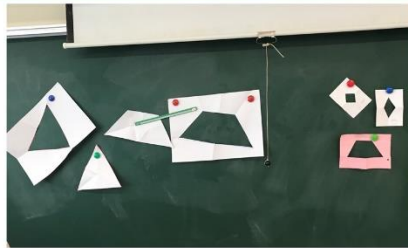
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<https://youtu.be/0lc3xbmlFt0>

「剪一刀」

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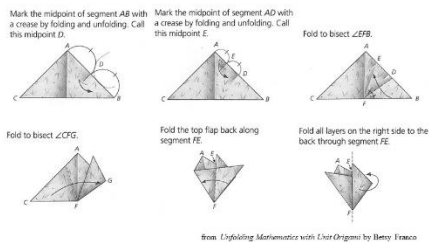
「剪一刀」

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正五邊形

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正五邊形

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這是個數學正確的摺法嗎?



數學與藝術

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謝謝!

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映形