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**Algebra and geometry by means of paper folding. (Algebra og geometri ved hjelp av papirbretting.)**

Normat 46, No. 4, 170-185 (1998).

If two points  $A, A'$  in the plane are symmetrical with respect to the line  $c$  we say that, by folding the paper along the crease  $c$ , the point  $A$  is sent to the point  $A'$ . "Admissible" paper-folding procedures are listed as game rules: starting with an initial set of points one must reach new points by applying a number of admissible steps. The most far-reaching procedure in the list is the following: given two points  $A, B$ , and two lines  $a, b$ , find a crease which simultaneously sends  $A$  to a point  $A'$  on  $a$  and  $B$  to a point  $B'$  on  $b$ . The reader is invited to experiment with thin semi-transparent paper in order to see that up to three such creases exist. The analytical approach leads to the surprising conclusion that this game includes and surpasses ruler-and-compass constructions, by solving all geometrical problems of degree  $\leq 3$ , e.g. the duplication of a cube, the trisection of an angle and the construction of regular  $n$ -gons,  $n = 2^h 3^k q_1 q_2 \dots q_m$  for distinct primes, of the form  $q_i = 1 + 2^{u+1} 3^v$ . (orig.)

*Classification:* G40

*Keywords:* ruler and compass constructions; duplication of a cube; trisection of an angle; construction of regular  $n$ -gons