Comprehension questions
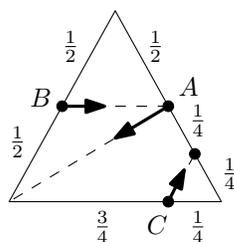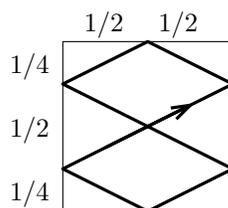
PROBLEM 7.1. *In the phase space for billiards in an equilateral triangle with side-lengths 1, what are the (s, θ)-coordinates of the following points-and-directions A, B, C (you can correspondingly label the sides as a, b, c):*

PROBLEM 7.2. *Take the following 6-bounce trajectory in a 1x1 square:*

What does it look like in phase space? (The answer should consist of points in phase space – both picture and phase space coordinates – together with an instruction of how the billiards map takes those points to each other.)

PROBLEM 7.3. *For an equilateral triangle, draw a picture of phase space, and color in differently the regions consisting of those points p such that $T(p)$ will correspond to a point lying on each of the three sides of our triangle. Your picture should look qualitatively correct, but does not need to be quantitatively precise (the boundaries between the regions do not have to be drawn exactly).*

18.900 Geometry and Topology in the Plane
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