

D4

Work on the following in pairs or groups of three.

Our goal is to describe all possible ways that a square's position could be altered through movement. In this investigation we don't care about the actual movement of the square so much the 'net change in position' of the square. For examples, rotating the square counterclockwise by 90° results in the same 'net change in position' as if we rotated the square counterclockwise 450° . Let us denote the counterclockwise rotation by 90° as R_{90} .

1. Find all possible ways that a square could be repositioned.

Make sure that you clarify any notation that you create.

2. Consider 'composing' movements. For example R_{90} followed by R_{90} would yield an overall 180° counterclockwise rotation. Let R_{180} denote rotation counterclockwise by 180° , then the previous example can more briefly be said as: $R_{90} \circ R_{90} = R_{180}$.

Take six pairs of the movements you identified in number 1. and determine if the composition is equal to any of the other movement you identified.