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## WHAT IS THE MAXIMUM ORDER OF A PLANAR SIGNED CLIQUE?

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A homomorphism of  $G$  to  $H$  is a mapping from  $V(G)$  to  $V(H)$  such that an edge of  $G$  is mapped to an edge of  $H$ . Homomorphisms are related to (proper) vertex colourings since a vertex  $v$  of  $G$  can be "coloured" by the vertex of  $H$  that is a homomorphic image of  $v$ . In this way the chromatic number of  $G$  is simply the smallest order of a homomorphic image of  $G$ . We define a clique to be a graph on  $n$  vertices that has chromatic number  $n$ . In this talk we will focus on signed graphs, graphs where each edge is either positive or negative. We will define vertex colouring of signed graphs using signed graph homomorphisms and answer the question of the title in general. For all-positive signed graphs, which correspond to graphs, the answer is given by the Four-Colour-Theorem and by the existence of a planar clique on four vertices, and therefore is 4.