Josephine Brooks* (j.brooks@mail.utoronto.ca), Department of Mathematics, Bahen Centre, 40 St. George Street, University of Toronto, Toronto, M5S 2E4, Canada, Alvaro Carbonero (carboa1@unlv.nevada.edu), Department of Mathematical Sciences, University of Nevada, Las Vegas, Box 454020, 4505 S. Maryland Pkwy, Las Vegas, NV 89154-4020, and Joseph Vargas (varg0261@fredonia.edu), Mathematical Sciences Department, 223 Fenton Hall, SUNY Fredonia, Fredonia, NY 14063. Removing Symmetry in Circulant Graphs and Point-Block Incidence Graphs.

A vertex \( v \) in a graph \( G \) is fixed if it is mapped to itself under every automorphism of \( G \). The fixing number of a graph \( G \) is the minimum number of vertices, when fixed, fixes all of the vertices in \( G \). Fixing numbers were introduced by Laison, Gibbons, Erwin, Harary, and Boutin. A circulant graph is a graph of \( n \) vertices in which the \( i \)-th vertex is adjacent to the \( (i + j) \)th and \( (i - j) \)th graph vertices for each \( j \) in a list \( L \). We determine the fixing number for multiple classes of circulant graphs, showing in many cases the fixing number is 2. However, we show that circulant graphs with twins, which are pairs of vertices with the same open neighborhoods, have higher fixing numbers. A point-block incidence graph is a bipartite graph \( G = (P, B) \) with a set of point vertices \( P = \{p_1, p_2, ..., p_r\} \) and a set of blocks \( B = \{B_1, B_2, ..., B_s\} \) where \( p_i \in P \) is adjacent to \( B_j \in B \Leftrightarrow p_i \in B_j \). We show that symmetries in certain block designs cause the fixing number to be as high as \( \frac{|V(G)|}{4} \). We also present several infinite families of graphs in which fixing any one vertex in \( G \) fixes every vertex in \( G \), thus removing all symmetries from the graph. (Received August 04, 2020)