1999 Paper 13 Question 4

Computer Graphics and Image Processing

You have a cone of height one unit; apex at the origin; and base of diameter one unit centred on the negative z-axis.

You wish to transform this cone so that the apex is at $(-1, 3, 7)$, the base is centred at $(2, 7, -5)$, and the base's radius is four units. What transformations are required to achieve this and in what order should they be performed? [8 marks]

Describe an algorithm which clips an arbitrary polygon against an arbitrary *convex* polygon (in 2D). [8 marks]

Will your algorithm correctly clip an arbitrary polygon against an arbitrary *non-convex* polygon? If so, explain why and demonstrate an example which illustrates that it does work in such cases. If not, explain why not and outline how your algorithm could be extended to perform clipping in such cases.
[4 marks]