

E4-3DGS: Exploring Perspective Triangles¹

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Introduction:

Section 4.3 of *A Course in Modern Geometries* introduces two relations between triangles. One of these relates triangles that are said to be *perspective from a point* and the other relates triangles that are said to be *perspective from a line*. These relations, like others in projective geometry, are defined entirely in terms of incidence properties, i.e., in terms of points on a line, lines through a given point, points of intersection of line pairs and lines determined by point pairs. Since each pair of lines intersects in projective geometry, it is essential to be able to locate all points of intersection in these relations. *Dynamic Geometry Software's* ability to maintain incidence properties while points and/or lines are dragged, makes it relatively easy to find constructions where all the appropriate points of intersection are visible. Exercises 1, 2 and 4 in Section 4.3 are easily carried out using *Cabri Geometry* or *Geometer's Sketchpad* and the use of one of these will demonstrate the immense value of using dynamic geometry software (*DGS*) in the study of plane projective geometry.² Skills acquired in working with *DGS* on these exercises will enhance the users ability to carry out the more advanced constructions in Explorations 4.4–4.6.

Equipment and Materials Needed:

A computer (Macintosh or a PC running Windows) with access to either *Cabri Geometry II* or *Geometer's Sketchpad, Version 3 or 4*, and a disk on which to save files.

Report:

Submit a computer folder titled “E4-3CG” or “E4-3GS” (depending on whether you used *Cabri* or *Sketchpad*). This folder should contain the constructions listed below for Exercises 1, 2 and 4 of Section 4.3. For each, be sure to use the appropriate extension, i.e., “.gsp” for *Sketchpad* sketches and “.fig” for *Cabri* figures.

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|-----------|-----------|------------|
| 1. Per-pt | 2. Per-ln | 4. UVW-col |
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¹Designed to supplement Section 4.3 in *A Course in Modern Geometries, 2nd Ed.*; revised by JNC July 24, 2002

²For an introduction to these programs, see the explorations E1-CG (for *Cabri*) or E1-GS (for *Sketchpad*).