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pencil

Canonical name	Pencil
Date of creation	2013-03-22 15:21:31
Last modified on	2013-03-22 15:21:31
Owner	CWoo (3771)
Last modified by	CWoo (3771)
Numerical id	5
Author	CWoo (3771)
Entry type	Definition
Classification	msc 51A99
Related topic	FanOfLines
Related topic	HyperbolasOrthogonalToEllipses
Defines	flat pencil

A *pencil* is a set of geometric objects, usually either congruent or similar to each other, that share a common incidence property. Below are some of the most commonly encountered pencils:

1. A pencil of lines usually means a set of straight lines that are incident with one point. If the lines all lie in the same plane, the pencil is sometimes called a *flat pencil*.
2. In some cases, a pencil of lines denotes a set of parallel lines in a plane. If a point of infinity is added to the plane, then we are back to the previous example.
3. A pencil of circles can mean that either these circles all intersect at exactly one point (or share the same tangent line)
4. A pencil of circles can also mean that the circles have two common points of intersection.

## References

- [1] E. Artin, *Geometric Algebra*, Wiley-Interscience, Reprint (1988).
- [2] H. S. M. Coxeter, *Projective Geometry*, Springer-Verlag, 2nd Edition (2003).