HOW TO DISTINGUISH BETWEEN PLANE SYMMETRIES

Recognition Chart for Plane Periodic Patterns

Type	Lattice	Highest Order Rotation	Non-trivial Glide Reflections	Generating Region	Helpful Distinguishing Properties
p1	parallelogram	1	no	no	1 unit
p2	parallelogram	2	no	no	1/2 unit
pm	parallelogram	1	yes	no	1/2 unit
pg	rectangular	1	no	yes	1/2 unit
cm	rhombic	1	yes	yes	1/2 unit
pmm	rectangular	2	yes	no	1/4 unit
pmg	rectangular	2	yes	yes	1/4 unit	parallel reflection axes
pgg	rectangular	2	no	yes	1/4 unit
cmm	rhombic	2	yes	yes	1/4 unit	perpendicular reflection axes
p4	square	4	no	no	1/4 unit
p4m	square	4	yes	yes	1/4 unit	4-fold centres on reflection axes
p4g	square	4	yes	yes	1/4 unit	4-fold centres *not* on reflection axes
p3	hexagonal	3	no	no	1/3 unit
p3m1	hexagonal	3	yes	yes	1/6 unit	all 3-fold centres on reflection axes
p31m	hexagonal	3	yes	yes	1/6 unit	*not* all 3-fold centres on reflection axes
p6	hexagonal	6	no	no	1/6 unit
p6m	hexagonal	6	yes	yes	1/12 unit

Notes:

(1) A rotation through an angle of $360°/n$ is said to have order n. A glide-reflection is non-trivial if its component translation and reflection are not symmetries of the pattern.

(2) A smallest region of the plane having the property that the set of its images under the translation group covers the plane is called a unit of the pattern.

(3) A generating region is a smallest region whose images under the full symmetry group of the pattern cover the plane.