RULES of TRANSFORMATIONS

Reflections

ACROSS	DESCRIPTION	RULE	EXAMPLE
across x-axis	invert y	(x,y) → (x,–y)	(3,4) → (3,–4)
across y-axis	invert x	(x,y) → (–x,y)	(5,8) → (–5,8)
across y = x	swap x and y	(x,y) → (y,x)	(10,–2) → (–2,10)
across y = –x	invert x and y swap x and y	(x,y) → (–y,–x)	(–3,5) → (–5,3)

Translations

MOVEMENT	DESCRIPTION	RULE	EXAMPLE
up 2, right 5	add # to each	(x,y) → (x+5,y+2)	(2,1) → (7,3)
down 3, left 4	subtract # from each	(x,y) → (x-4,y-3)	(10,10) → (6,7)

Rotations

ABOUT ORIGIN	DESCRIPTION	RULE	EXAMPLE
90° clockwise (CW) **270° counter (CCW)**	invert x swap x any y	(x,y) → (y,–x)	(6,1) → (1,–6)
180° clockwise (CW) **180° counter (CCW)**	invert x and y	(x,y) → (–x,–y)	(–4,5) → (4,–5)
270° clockwise (CW) **90° counter (CCW)**	invert y swap x and y	(x,y) → (–y,x)	(11,–2) → (2,11)

Dilations

SCALE	DESCRIPTION	RULE	EXAMPLE
scale factor of 3	multiply both by #	(x,y) → (3x,3y)	(3,5) → (9,15)
scale factor of 1/2	divide both by #	(x,y) → (x/2,y/2)	(8,–6) → (4,–3)