

Surprising Transformation

4 Trial and Error plots using Geozebra(Pictures of Geozebra included)

Trail 1	Steps	Transformation	Two points of the lines	Line equation	Meaning in actions on the line equation	Comments
	1		A(0,7), B(-1,3)	$Y=4X+7$		
	2.	Down 3 units	C(0,4),D(-1,0)	$Y=4X+4$	$Y=4X+7-3$	
	3.	Left 2 units	E(-2,4),F(-3,0)	$Y=4X+12$	$Y=4(X+2)+4$	
	4.	Reflect in Vertical Axis	G(2,4),H(3,0)	$Y=-4x+12$	$Y=-4X+12$	
	5.	Reflect in Horizontal Axis	I(2,-4),H(3,0)	$Y=4X+12$	$Y=+4X+12$	It does not end with $Y=4X-2$

Trail 2	Steps	Transformation	Two points of the lines	Line equation	Meaning : actions on the line equation	Comments
	1		A(0,7), B(-1,3)	$Y=4X+7$		
	2.	Left 2 units	C(-2,7),D(-3,3)	$Y=4X+15$	$Y=4(X+2)+7$	
	3.	Down 3 units	E(-2,4),F(-3,0)	$Y=4X+12$	$Y=4X+15-3$	
	4.	Reflect in Vertical Axis	G(2,4),H(3,0)	$Y=-4x+12$	$Y=(-1)*4X+12$	
	5.	Reflect in Horizontal Axis	I(2,-4),H(3,0)	$Y=4X+12$	$Y=+4X+12$	It does not end with $Y=4X-2$

Trail 3	Steps	Transformation	Two points of the lines	Line equation	Meaning : actions on the line equation	Comments
	1		A(0,7), B(-1,3)	$Y=4X+7$		
	2.	Reflect Vertical Axis	C(0,7),D(1,3)	$Y=-4X+7$	$Y=(-1)*4X+7$	
	3.	Reflect on Horizontal axis	E(0,-7),F(1,-3)	$Y=4X-7$	$Y=(-1)*(-4X)+7$	
	4.	Translate Left 2 units	G(-2,-7),H(-1,-3)	$Y=4X+1$	$Y=4(X+2)-7$	
	5.	Translate Down 3 units	I(-2,-10),H(-1,-6)	$Y=4X-2$	$Y=4X+1-3$	It ends with $Y=4X-2$

Trail 4	Steps	Transformation	Two points of the lines	Line equation	Meaning : actions on the line equation	Comments
	1.		A(0,7), B(-1,3)	$Y=4X+7$		
	2.	Reflect Horizontal-Axis	C(0,-7),D(-1,-3)	$Y=-4X-7$	$Y=(-1)*(4X+7)$	
	3.	Reflect on Vertical axis	E(0,-7),F(1,-3)	$Y=4X-7$	$Y=(-1)*(-4X)-7$	
	4.	Translate left 2 Units	G(-2,-7),H(-1,-3)	$Y=4X+1$	$Y=4(X+2)-7$	
	5.	Translate Down 3 Units	I(-2,-10),J(-1,-6)	$Y=4X-2$	$Y=4X+1-3$	It ends with $Y=4X-2$

Conclusions:

To reach the end result of $Y=4X-2$ from $Y=4x+7$, as long as the 2 initial transformation steps start with reflections, the order of reflect in vertical and horizontal are not important.

The transformation of Translation and Reflections sequences affect the outcome. If transformations start with translations (Left Down, or Down Left), it will not reach the $Y=4X-2$ from $Y=4X+7$.

I conclude the meanings of Transformation:

Reflect Horizontal-Axis on $Y=mX+c$ means: $Y=(-1)(mX+c)$

Reflect on Vertical axis on $Y=mX+c$ means: $Y=(-1)(mX) +c$

Translate left by 'a' Units on $Y=mX+c$ means : $Y=m(X+a)+c$

Translate Down 'b' Units on $Y=mX+c$ means: $Y=mX+c-b$

I predict translate right by 'a' units on $Y=mX+c$ means $Y=m(X-a)+c$

I predict translate up by 'b' units on $Y=mX+c$ means $Y=mX+c+b$