Section 9.5: Composition of Transformations

EQ: What is a glide reflection?

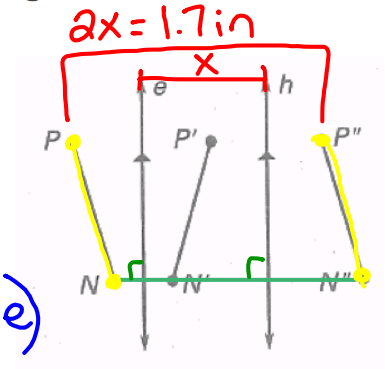
Composition
2 or more transformations combined

Glide Reflection
A translation AND reflection composition

Theorem 9.4: Composition Theorem
A COMPOSITION of 2 or more ISOMETRIES is an ISOMETRY.

Theorem 9.5: Reflections over/in Parallel Lines Theorem:
A reflection of a figure *over/in/about* two parallel lines is a TRANSLATION of length TWICE the distance BETWEEN the PARALLEL lines.

A1. In the figure, $\overline{NP}$ is reflected over *line e* forming $\overline{N'P'}$, then $\overline{N'P'}$ is reflected over *line h* forming $\overline{N''P''}$.



a. Which line(s) are perpendicular $\overline{NN''}$?

line e and line h

b. What is the single transformation maps $\overline{NP}$ onto $\overline{N''P''}$?

A translation (shift/glide)

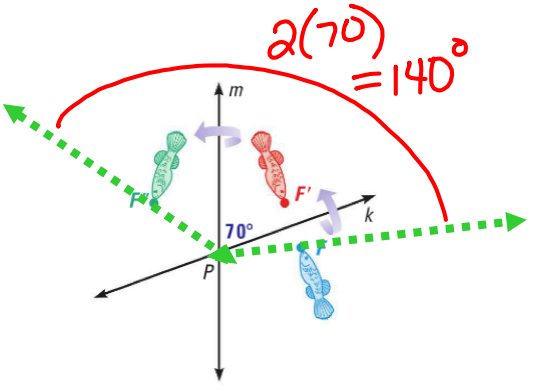
c. If the $PP'' = 1.7\ in$, what is the distance between *line e* and *line h*?

$\frac{2x}{2} = \frac{1.7}{2}$ $x = .85$ in

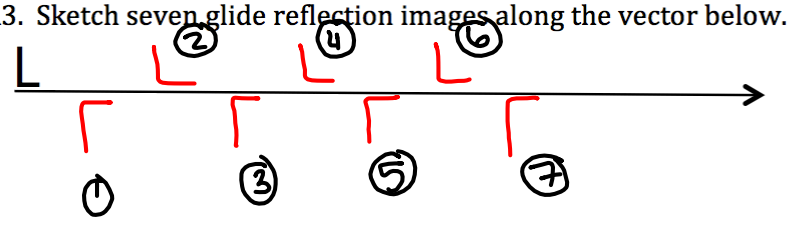
Theorem 9.5: Reflections over/in Intersecting Lines Theorem:

A reflection of a figure *over/in/about* two intersecting lines is a ROTATION of degree TWICE the ANGLE formed by the INTERSECTING lines.

A2. Describe the single transformation that maps F to F''.

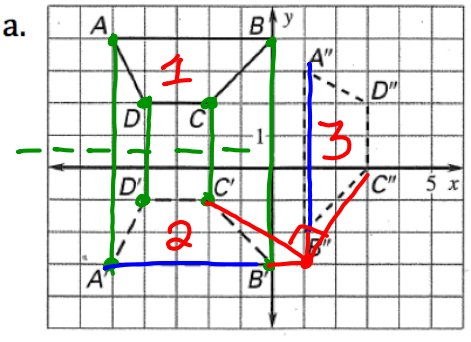


A3. Sketch seven glide reflection images along the vector below.



A4. Describe the composition of the transformations.

a.

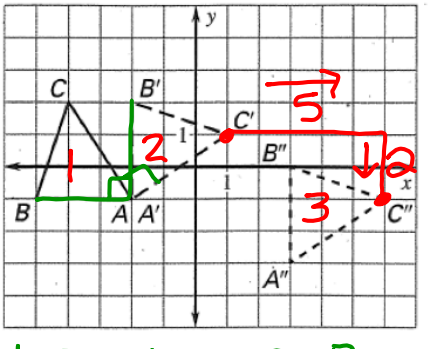


1st Reflection over $y=1/2$

2nd $\overline{A'B'} \perp \overline{A''B''}$

Rotation 90° clockwise about (1,−3)

b.



1st Rotation 90° clockwise about (−2,1)

2nd Translation $\langle 5,2 \rangle$

OR $(x+5, y+2)$

A5. List the result of C(11, -8) after the the composite of transformations.

1st: Rotation of 90° $(x, y) \to (-y, x)$
2nd: Reflection over $y = -x$
3rd: $(x, y) \to (x + 3, y)$ $(x,y) \to (-y,-x)$

$C'(8,11)$ $C''(-11,-8)$ $C'''(-8,-8)$
$-8, 11$ $11,8$ -11 -8
$+3$ $+0$

A6. List the result of C(11, -8) after reversing the order of the transformations for A5.

$C'(14,8)$ $C''(-8,-14)$ $C'''(14,-8)$
11 -8
$+3$ $+0$ $8,14$ $-14,-8$

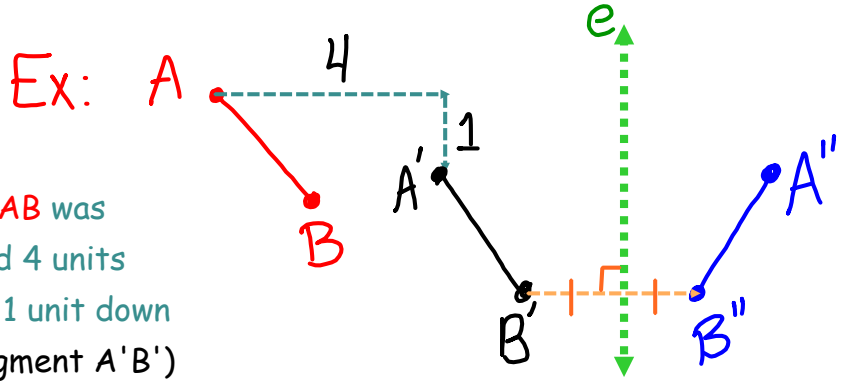
A7. Compare the results from A5 and A6. Make a statement about reversing the order of the composite transformations

#A5 $C'''(-8,-8)$
#A6 $C'''(14,-8)$
> Final image is different

*order of tranformations matters!

Sec 9.5 Summary:

A glide reflection is a translation (shift/slide/glide) and a reflection (flip) combined on a figure.



Segment AB was translated 4 units right and 1 unit down ‹4,-1› (segment A'B') then reflected over line e (segment A"B")