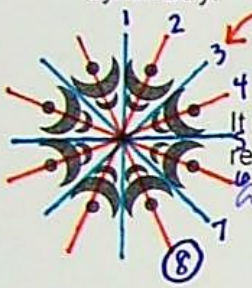
Reflectional Symmetry

An image has **Reflectional Symmetry** if there is at least one line which splits the image in half so that one side is the mirror image of the other. Reflectional symmetry is also called **line symmetry** or **mirror symmetry** because there is a line in the figure where a mirror could be placed, and the figure would look the same.

Think of a figure on a piece of paper, then folding the paper in two so that the two halves match up, or actually placing a mirror on the line of symmetry.



8 lines of symmetry!

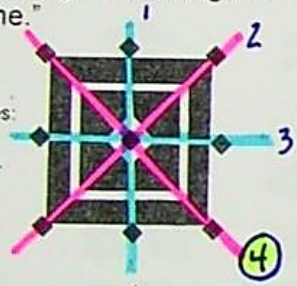
It is possible to have more than one line of reflectional symmetry.

and some figures don't have any lines of symmetry!

1 line of symmetry

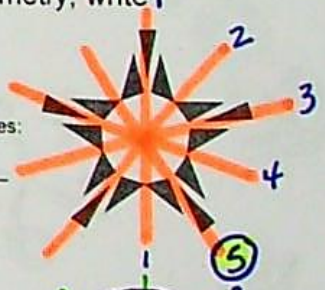
Draw all of the **lines of symmetry** for each figure. Indicate the number of lines of symmetry for each figure. If the figure does not have reflectional symmetry, write "none."

1 #of lines: 4



2 #of lines: 1

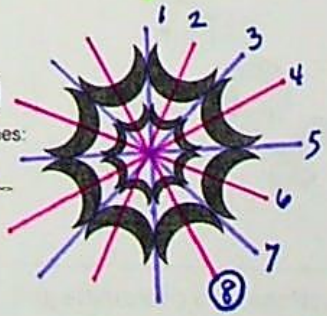
3 #of lines: 5



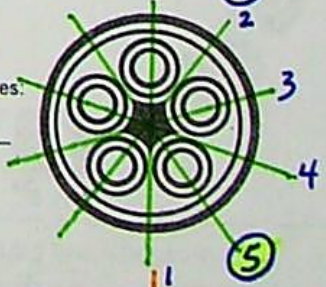
4 #of lines: 0

(because of the shading!)

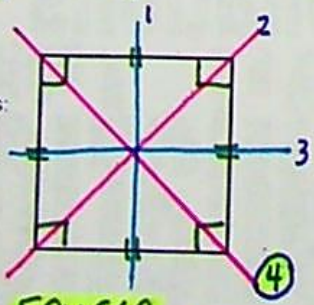
5 #of lines: 8



6 #of lines: 5

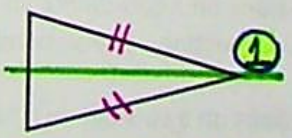


7 #of lines: 4*



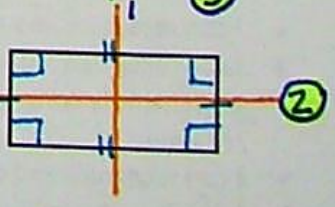
* If a square, then 4 lines of symmetry!

8 #of lines: 1*



* If an isosceles triangle, then 1 line of symmetry!

9 #of lines: 2*



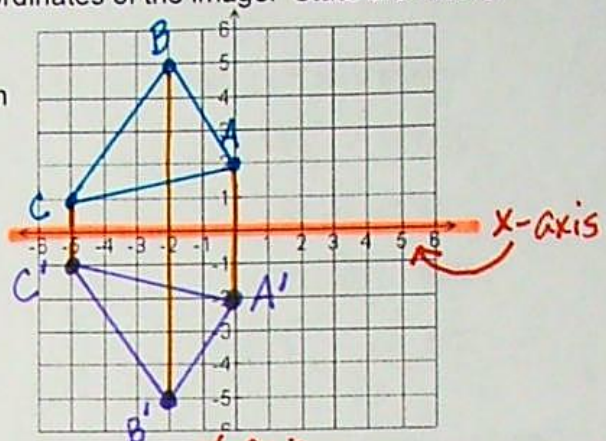
* If a rectangle, then 2 lines of symmetry!

Action word: "FLIP"

Notes for Reflectional Symmetry on a Coordinate Grid

The vertices of a polygon are listed. Graph and label each polygon and its image after a reflection over the given line. Name the coordinates of the image. State the rule for the transformation.

1. "Flip" Reflect over the **x-axis**. (The x-axis can also be described as the line $y = 0$.)



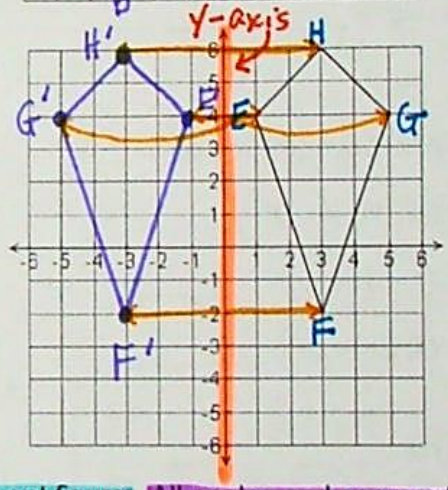
A (0, 2) → A' (0, -2)

B (-2, 5) → B' (-2, -5)

C (-5, 1) → C' (-5, -1)

General rule: $(x, y) \rightarrow (x, -y)$

2. "Flip" Reflect over the **y-axis**. (The y-axis can also be described as the line $x = 0$.)



E (1, 4) → E' (-1, 4)

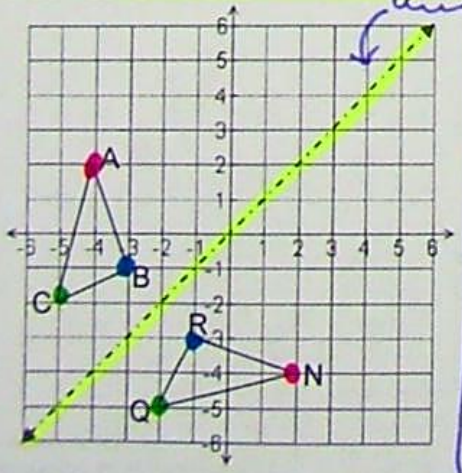
F (3, -2) → F' (-3, -2)

G (5, 4) → G' (-5, 4)

H (3, 6) → H' (-3, 6)

General rule: $(x, y) \rightarrow (-x, y)$

A reflectional transformation results in a congruent figure. All angles and segments maintain the same measurements. Identify the congruent parts for the following triangle that was reflected over the line $y = x$.



$\overline{AB} \cong \overline{NR}$ $\quad \angle A \cong \angle N$

$\overline{BC} \cong \overline{RQ}$ $\quad \angle B \cong \angle R$

$\overline{CA} \cong \overline{QN}$ $\quad \angle C \cong \angle Q$

$\triangle ABC \cong \triangle NRQ$

Note:
~ Same shape
= Same size
≅ Congruent

State the coordinates of A and its corresponding vertex:

A: (-4, 2) N: (2, -4)

Write the general rule for a reflection over the line $x = y$

$(x, y) \rightarrow (y, x)$, ll

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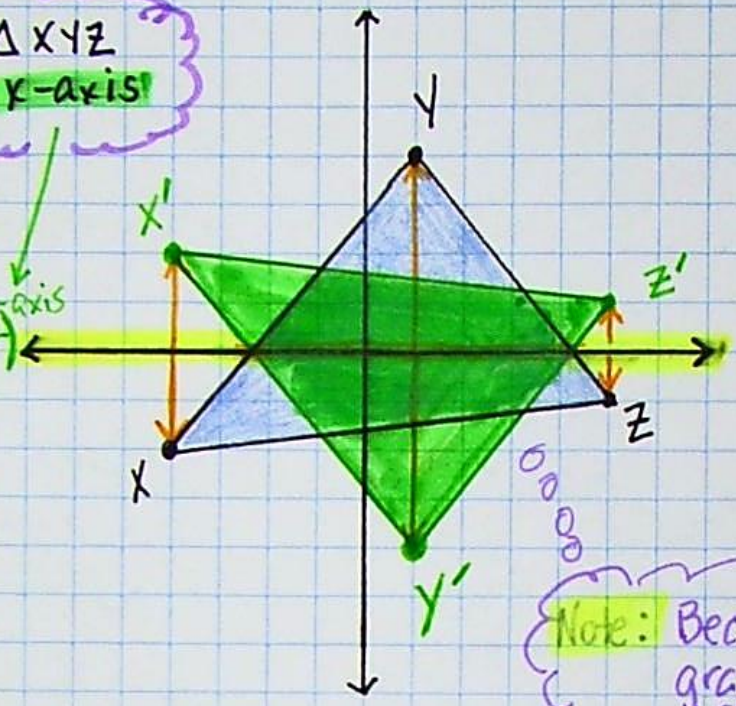
Like problem 3

Just follow the RULES!

Ex: Reflect $\triangle XYZ$
* over the x-axis!

(flip over) x-axis



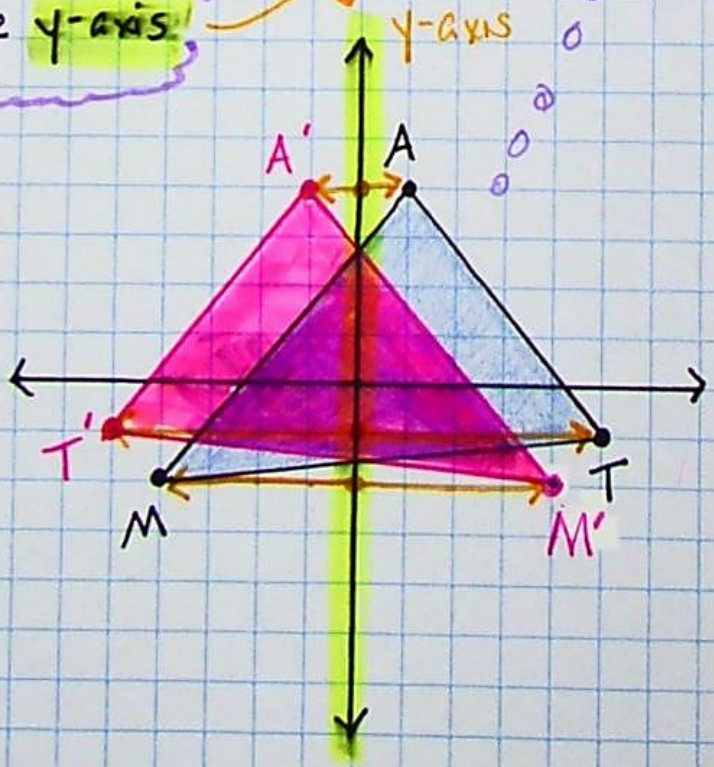
X (-4, -2) X' (-4, 2)
Y (1, 4) Y' (1, -4)
Z (5, -1) Z' (5, 1)

Rule

$(x, y) \rightarrow (x, -y)$

Note: Because these figures are graphed on the line of reflection, they "flip" over themselves!

Ex: Reflect $\triangle MAT$
* over the y-axis



M (-4, -2) M' (4, -2)
A (1, 4) A' (-1, 4)
T (5, -1) T' (-5, -1)

Rule

$(x, y) \rightarrow (-x, y)$