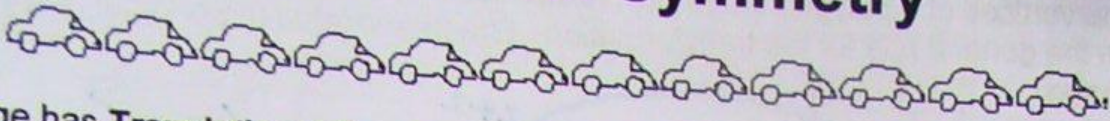
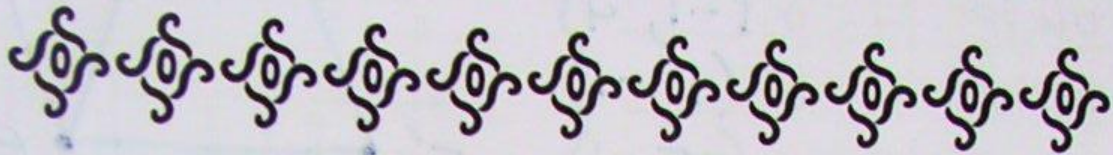


Translational Symmetry

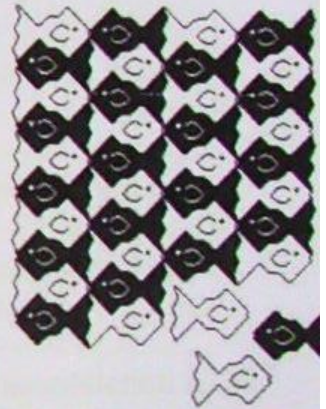
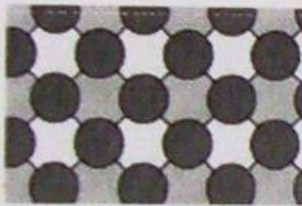
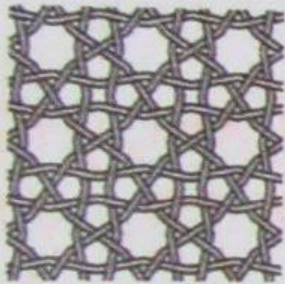


An image has **Translational Symmetry** if it can be divided by straight lines into a sequence of identical figures. Translational symmetry results from moving a figure a certain distance in a certain direction also called translating (moving) by a vector (length and direction).



A tessellation is created when a shape is repeated over and over again covering a plane without any gaps or overlaps.

Another word for a tessellation is a **tiling**.



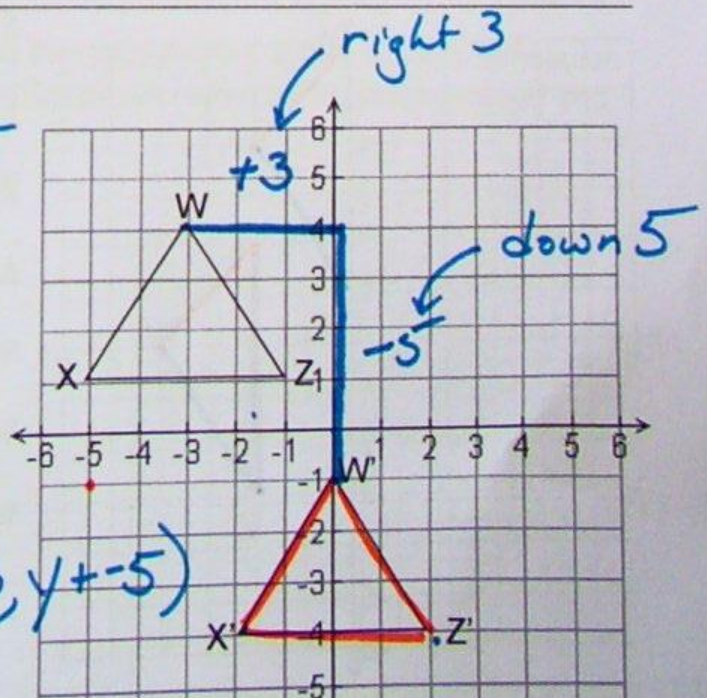
NOTES for Translational Symmetry

1. Name the coordinates of the image and its translation. State the rule for the transformation.

$W (-3, 4) \rightarrow W' (0, -1)$
 $X (-5, 1) \rightarrow X' (-2, -4)$
 $Z (-1, 1) \rightarrow Z' (2, -4)$

Handwritten annotations: $x+3$ and $y+5$ with arrows pointing from the original coordinates to the translated coordinates.

General rule: $(x, y) \rightarrow (x+3, y+5)$



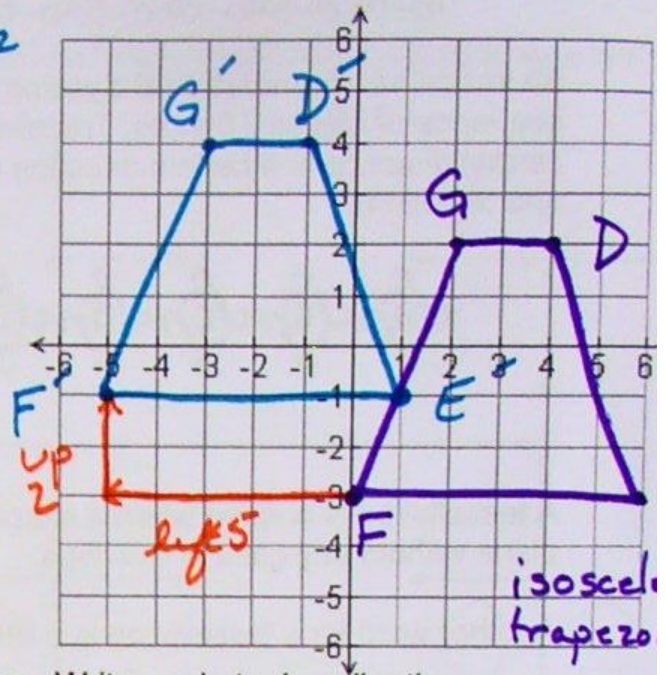
NOTES for Translational Symmetry, continued

2. The vertices of a polygon are listed. Name the coordinates of the image's translation given the general rule for the transformation. Graph and label the original polygon and its image.

General rule: $(x, y) \rightarrow (x + \bar{5}, y + 2)$

$D(4, 2) \rightarrow D'(-1, 4)$
 $E(6, -3) \rightarrow E'(1, -1)$
 $F(0, -3) \rightarrow F'(-5, -1)$
 $G(2, 2) \rightarrow G'(-3, 4)$

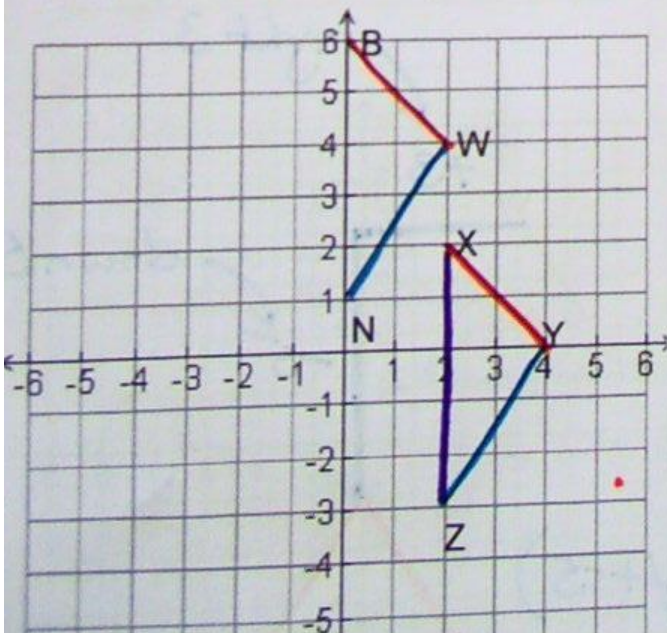
Handwritten notes: "2+2" above the rule, "4+-5" next to D', "Add" written in red below the list.



3. A point and its image after a translation are given. Write a rule to describe the translation.

- a. The translation that takes $A(8, -6)$ to $A'(9, -3)$ $(x, y) \rightarrow (x+1, y+3)$
- b. The translation that takes $B(2, -10)$ to $B'(2, -12)$ $(x, y) \rightarrow (x+0, y+-2)$
 $(x, y-2)$
- Handwritten notes: "Add" written in red above the list, red arrows pointing from the original points to the images.*

4. A translational transformation also results in a congruent figure. Identify the congruent parts for triangle XYZ that was translated 2 units to the left and 4 units up.



$\overline{XY} \cong \overline{BW}$ $\angle W \cong \angle Y$
 $\overline{YZ} \cong \overline{WN}$ $\angle N \cong \angle Z$
 $\overline{ZX} \cong \overline{BN}$ $\angle B \cong \angle X$
 $\triangle XYZ \cong \triangle BWN$ (order matters)

State the coordinates of W and its corresponding vertex:

W: $(2, 4)$ Y: $(4, 0)$

Write the general rule for the translation

$(x, y) \rightarrow (x+2, y+-4)$