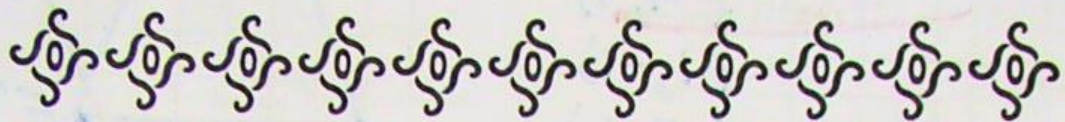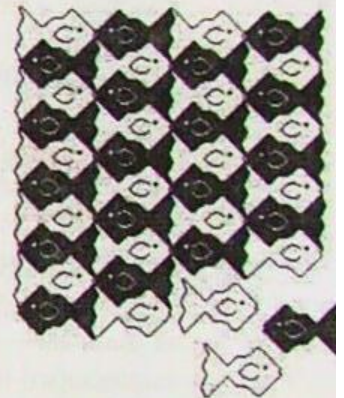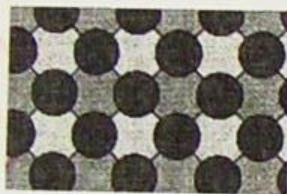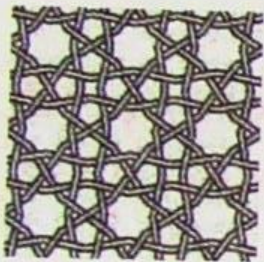# Translational Symmetry

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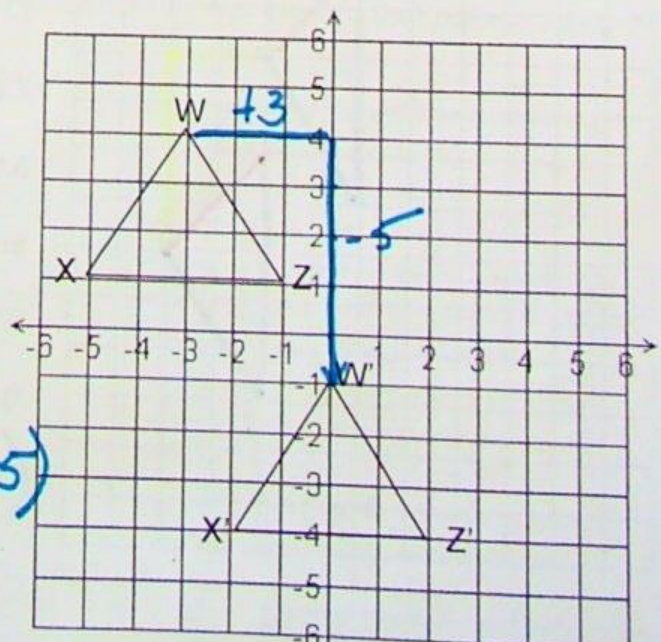
Another word for a tessellation is a **tiling**.

NOTES for Translational Symmetry

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

$x + 3$

W $(-3, 4)$ → W' $(0, -1)$

X $(-5, 1)$ → X' $(-2, -4)$

Z $(-1, 1)$ → Z' $(2, -4)$

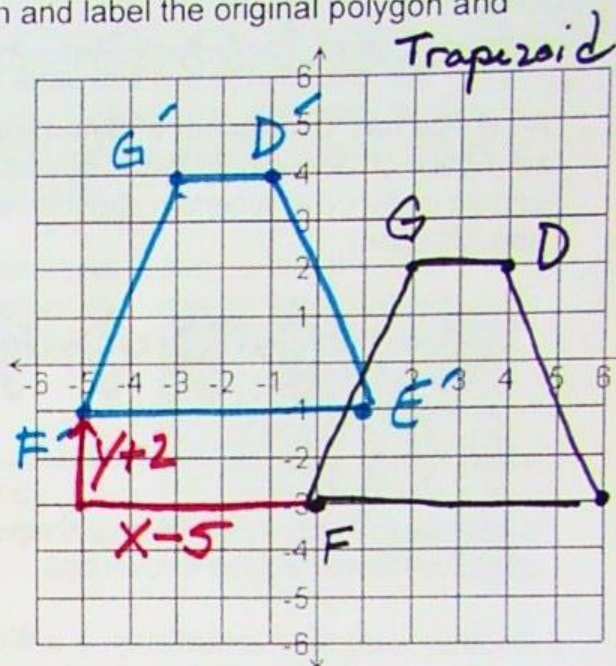General rule: $(x, y) \rightarrow (x+3, y-5)$

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.
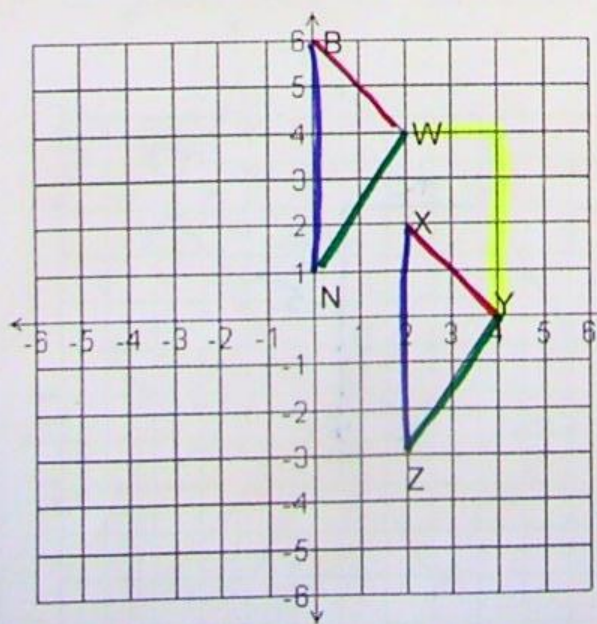
Trapezoid

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

D (4, 2) $\xrightarrow[2+2]{4+-5}$ D' $(-1, 4)$

E (6, -3) $\rightarrow$ E' $(1, -1)$

F (0, -3) $\rightarrow$ F' $(-5, -1)$

G (2, 2) $\rightarrow$ G' $(-3, 4)$

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

Add

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) $(x, y) \rightarrow (x+0, y-2)$

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.

$\overline{XY} \cong \overline{BW}$ $\angle W \cong \angle Y$

$\overline{YZ} \cong \overline{WN}$ $\angle N \cong \angle Z$

$\overline{ZX} \cong \overline{BN}$ $\angle B \cong \angle X$

$\triangle XYZ \cong \triangle BWN$

State the coordinates of W and its corresponding vertex:

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

Write the general rule for the translation

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