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Slide! **Translational Symmetry** *Notes*

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.

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

Rule Note

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

Look at the change from W to W'

$$W(-3, 4)$$
$$W'(0, -1)$$

$$X: -3 + x = 0 \quad ? \quad Y: 4 + y = -1$$
$$ +3 \quad -4 -4$$
$$x = 3 \qquad\qquad y = -5$$
$$(x + 3) \qquad\qquad (y - 5)$$

W X+3

Y-5

vector

Z₁

W'

X

Z'

3

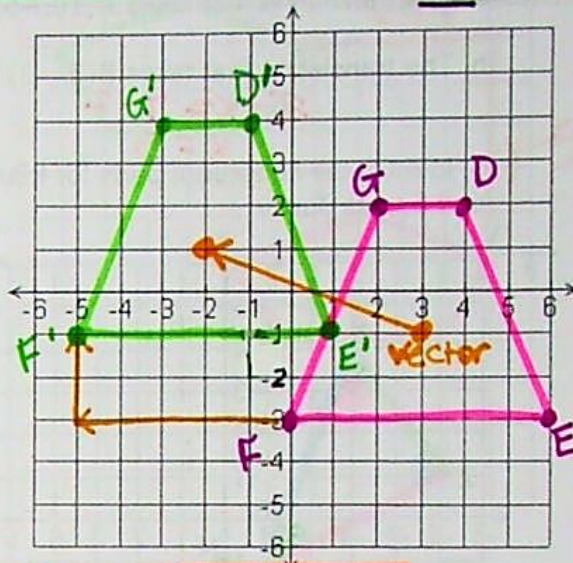vector

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slides!

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: $(x, y) \rightarrow (x - 5, y + 2)$

D (4, 2) → D' $(-1, 4)$

E (6, -3) → E' $(1, -1)$

F (0, -3) → F' $(-5, -1)$

G (2, 2) → G' $(-3, 4)$

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

$8 + x = 9$ $\quad -6 + y = -3$
$x = 1$ $\qquad\qquad y = 3$

a. The translation that takes A(8, -6) to A'(9, -3) $\quad (x, y) \rightarrow \underline{(x+1, y+3)}$

b. The translation that takes B(2, -10) to B'(2, -12) $\quad (x, y) \rightarrow \underline{(x, y-2)}$

$2 + x = 2$ $\qquad -10 + y = -12$
$x = 0$ $\qquad\qquad y = -2$

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.

$\overline{XY} \cong \underline{BW}$

$\overline{YZ} \cong \underline{WN}$

$\overline{ZX} \cong \underline{NB}$

$\triangle XYZ \cong \triangle BWN$

$\angle W \cong \angle Y$

$\angle N \cong \angle Z$

$\angle B \cong \angle X$
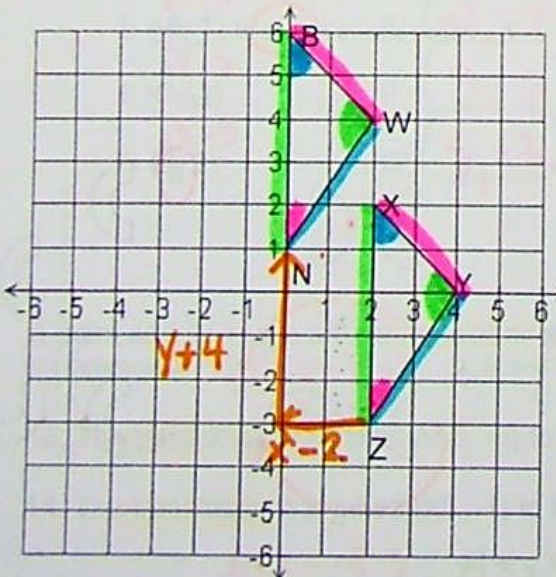
State the coordinates of W and its corresponding vertex:

W: $\underline{(2, 4)}$ $\qquad Y (4, 0)$

Write the general rule for the translation

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