

Unit 1 Lesson 1

Intro to Transformations + Translations

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$$y = 3x + 8$$

$$x = y$$

$$\begin{array}{r} x = 3x + 8 \\ -3x \quad -3x \\ \hline -2x = 8 \\ \frac{-2x}{-2} = \frac{8}{-2} \end{array}$$

solution: $x = -4$, $y = -4$

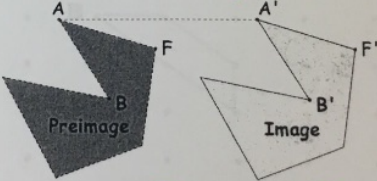
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QUIZ DATE: _____ TEST DATE: _____
 Math 2 – Honors Name _____
 Unit 1 – Geometric Transformations Date _____ Pd _____
 Lesson 1 – Introduction to Transformations and Translations



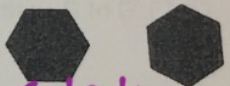
Introduction to Transformations and Translations

- **Congruent figures:** Figures with the same size + shape
 - ✓ When two figures are congruent, you can move one figure on top of the other figure with No overlap, fit over each other perfectly.
- **Transformation** of a geometric figure: change in its size, location, or orientation
- **Preimage** – Starting figure
 - ✓ Notation: A F B
- **Image** – New or resulting figure
 - ✓ Notation: A' F' B'
- **Isometry** – transformation in which preimage and image are the same size and Shape (also called: Rigid Motion)




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Examples:

		
<u>translation</u>	<u>reflection</u>	<u>rotation</u>
<u>slide</u>	<u>flip</u>	<u>turn</u>

- **Translation** – an isometry that maps all points the same distance and the same direction.

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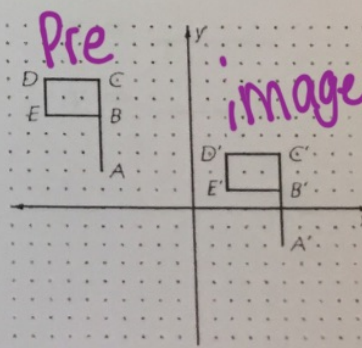
❖ Three ways to describe a translation (using example shown right):
 ✓ Always **be specific** when completing **any** type of description!!


1) **Words:** Translation to the right 10 units and down 4 units.

2) **Algebraic rule (motion rule):** $T: (x, y) \rightarrow (x + 10, y - 4)$

3) **Vector:** $\langle 10, -4 \rangle$

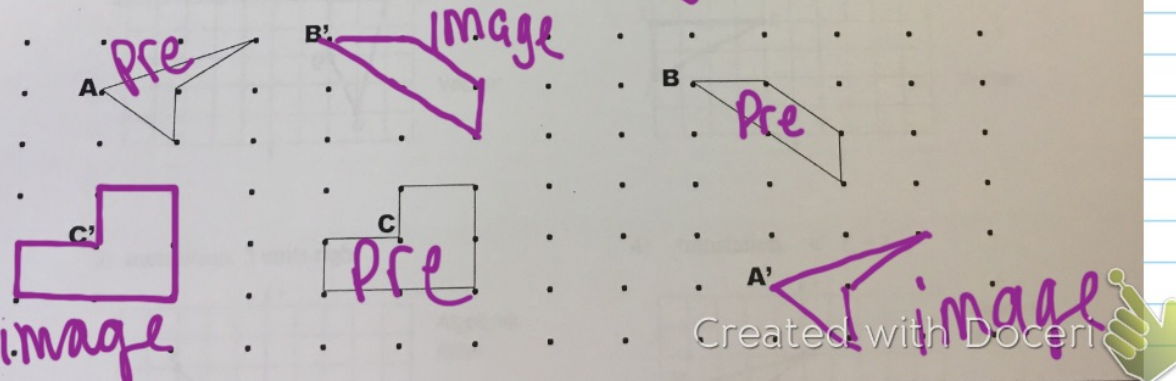
Handwritten notes: "left right" and "up down" are written vertically. "right down 10 4" is written below the vector notation.




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❖ Example: Dot Paper Translations

- Use the dots to help you draw the image of the first figure so that A maps to A'.
- Use the dots to help you draw the image of the second figure so that B maps to B'.
- Use the dots to help you draw the image of the third figure so that C maps to C'.
- Complete each of the following translation rules using your mappings from 1 – 3 above.
 - For A, the translation rule is: $T: (x, y) \rightarrow (x + 9, y - 4)$ or $\langle 9, -4 \rangle$
 - For B, the translation rule is: $T: (x, y) \rightarrow (x - 5, y + 1)$ or $\langle -5, 1 \rangle$
 - For C, the translation rule is: $T: (x, y) \rightarrow (x - 4, y)$ or $\langle -4, 0 \rangle$



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❖ **Example:** $\triangle GEO$ has coordinates $G(-2, 5)$, $E(-4, 1)$, $O(0, -2)$. A translation maps G to $G'(3, 1)$.

- Find the coordinates of: a) E' (1, -3) b) O' (5, -6) $G(-2, 5)$
 $G'(3, 1)$
- Describe the transformation in words: translate right 5, down 4
- The translation rule is $T: (x, y) \rightarrow (x+5, y-4)$
- The vector is \langle 5, -4 \rangle

❖ **Example:** Given the translation from $\triangle ABC$ to $\triangle A'B'C'$, find the specified values for x and y .
Hint: $\triangle ABC \cong \triangle A'B'C'$

$x =$ _____
 $y =$ _____

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❖ **Example:** Given the translation from $\triangle ABC$ to $\triangle A'B'C'$, find the specified values for x and y .
Hint: $\triangle ABC \cong \triangle A'B'C'$

$x =$ 3
 $y =$ 9

$5x + 3x = 24$
 $8x = 24$
 $\frac{8x}{8} = \frac{24}{8}$
 $x = 3$

$y = 3(3) = 9$

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Page 5 Extra Practice

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10) Translation: 3 units right and 4 units up

$P(-4, -3)$, $L(-2, -2)$, $T(-2, -4)$
 $+3 +4$ $+3 +4$ $+3 +4$

Vertices: $P'(-1, 1)$ $L'(1, 2)$ $T'(1, 0)$

Algebraic Rule: $T: (x, y) \rightarrow (x+3, y+4)$

Vector Notation: $\langle 3, 4 \rangle$

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