

Grab a new Bell Ringer and HW Tracker

Day 0 - Review

1. You have 5 math tests in the trimester. If you scored 88%, 83%, 97% and 91% on the first four tests, what must you score on the fifth test in order to have average of 90% on all 5 tests?

$$90 = \frac{88+83+97+91+x}{5} \quad \rightarrow \quad 359+x = 90(5)$$

$$359+x = 450$$

$$x = 450 - 359$$

$$x = 91$$

2. Find the mean, median, mode, range, Q1, Q3, interquartile range and standard deviation of the data.

4, 5, 5, 7, 7, 7, 8, 9, 9, 9, 9, 10, 16

Mean: 7.86 Median: 7 Mode: 7, 9 Range: 16-4 = 12 Q1: 6 Q3: 9 IQR: 9-6 = 3 SD: 2.75 σx

3. Which measure of central tendency best describes the data? Why?

Median
since outlier

Solutions

Day 0 - Review

1. You have 5 math tests in the trimester. If you scored 88%, 83%, 97% and 91% on the first four tests, what must you score on the fifth test in order to have average of 90% on all 5 tests?

91%

2. Find the mean, median, mode, range, Q1, Q3, interquartile range and standard deviation of the data:

4, 5, 5, 6, 7, 7, 7, 7, 8, 9, 9, 9, 9, 10, 16

Mean: 7.87 Median: 7 Mode: 7, 9 Range: 12 Q1: 6 Q3: 9 IQR: 3 SD: 2.75

3. Which measure of central tendency best describes the data? Why?

Median-there is an outlier

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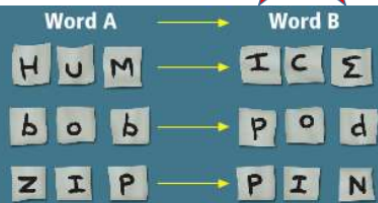


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Solve It: Getting Ready!

Suppose you write the letters shown on squares of tracing paper, so their shapes are visible from both sides. For each pair of words, how can you move the squares of paper to change Word A into Word B? Note: No square should remain in its original position.



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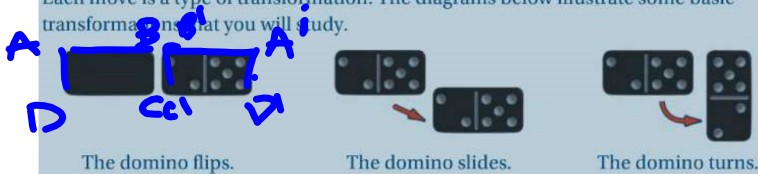
In the Solve It, you described changes in positions of letters. In this lesson, you will learn some of the mathematical language used to describe changes in positions of geometric figures.

Essential Understanding You can change the position of a geometric figure so that the angle measures and the distance between any two points of a figure stay the same.

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A **transformation** of a geometric figure is a function, or *mapping*, that results in a change in the position, shape, or size of the figure. When you play dominoes, you often move the dominoes by flipping them, sliding them, or turning them. Each move is a type of transformation. The diagrams below illustrate some basic transformations that you will study.



In a transformation, the original figure is the **preimage**. The resulting figure is the **image**. Some transformations, like those shown by the dominoes, preserve distance and angle measures. To preserve distance means that the distance between any two points of the image is the same as the distance between the corresponding points of the preimage. To preserve angles means that the angles of the image have the same angle measure as the corresponding angles of the preimage. A transformation that preserves distance and angle measures is called a **rigid motion**.

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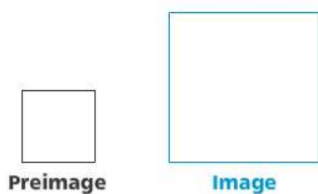
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Problem 1 Identifying a Rigid Motion

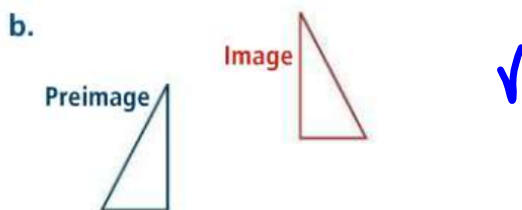
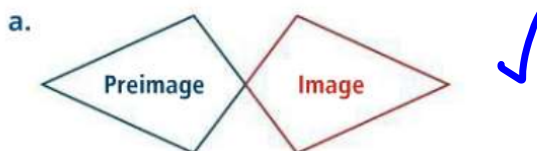


Does the transformation below appear to be a rigid motion? Explain.



got it pg 474

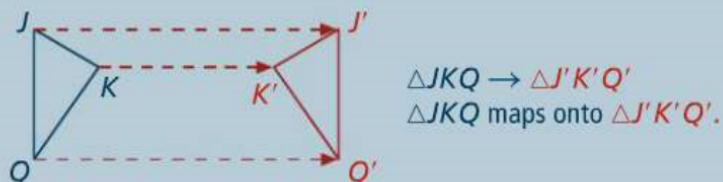
Got It? Does the transformation appear to be a rigid motion? Explain.



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A transformation maps every point of a figure onto its image and may be described with arrow notation (\rightarrow). Prime notation (') is sometimes used to identify image points. In the diagram below, K' is the image of K .



Notice that you list corresponding points of the preimage and image in the same order.

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Problem 2

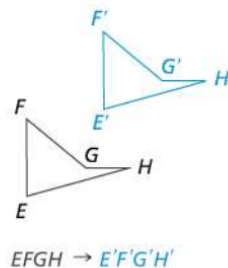
Naming Images and Corresponding Parts



In the diagram, $EFGH \rightarrow E'F'G'H'$.

A What are the images of $\angle F$ and $\angle H$?

$$\angle F' = \angle H'$$

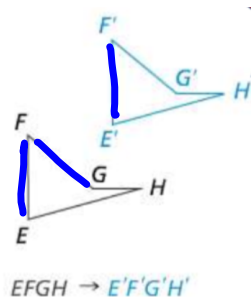


In the diagram, $EFGH \rightarrow E'F'G'H'$.

B What are the pairs of corresponding sides?

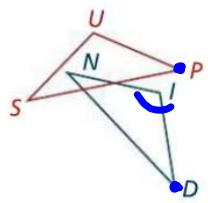
$$EF \cong E'F'$$

$$FG \cong F'G'$$



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Got It? In the diagram, $\triangle NID \rightarrow \triangle SUP$.
 a. What are the images of $\angle I$ and point D ?
 $\angle U, P$



b. What are the pairs of corresponding sides?

$NI \rightarrow SU$
 $ID \rightarrow UP$
 $DN \rightarrow PS$

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Translation - pg 476



take note

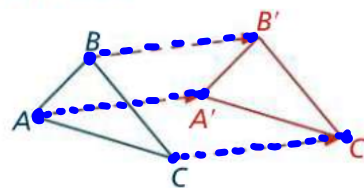
Key Concept Translation

A **translation** is a transformation that maps all points of a figure the same distance in the same direction.

You write the translation that maps $\triangle ABC$ onto $\triangle A'B'C'$ as $T(\triangle ABC) = \triangle A'B'C'$. A translation is a rigid motion with the following properties.

If $T(\triangle ABC) = \triangle A'B'C'$, then

- $AA' = BB' = CC'$
- $AB = A'B', BC = B'C', AC = A'C'$
- $m\angle A = m\angle A', m\angle B = m\angle B', m\angle C = m\angle C'$



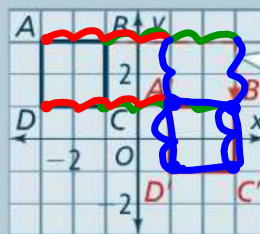
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$T_{\langle 4, -2 \rangle} ABCD$ $T_{\langle -3, 6 \rangle} XYZ$

The diagram at the right shows a translation in the coordinate plane. Each point of $ABCD$ is translated 4 units right and 2 units down. So each (x, y) pair in $ABCD$ is mapped to $(x + 4, y - 2)$. You can use the function notation

$T_{\langle 4, -2 \rangle}(ABCD) = A'B'C'D'$ to describe this translation, where 4 represents the translation of each point of the figure 4 units right and -2 represents the translation 2 units down.



B moves 4 units right and 2 units down.

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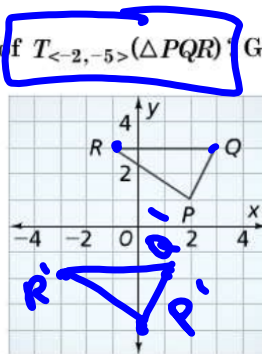


Problem 3

Finding the Image of a Translation



What are the vertices of $T_{\langle -2, -5 \rangle}(\triangle PQR)$? Graph the image of $\triangle PQR$.



$$T_{\langle -2, -5 \rangle}$$

← 2 ↓ 5

$$T_{\langle 11, -10 \rangle}$$

$$T_{\langle -1, 0 \rangle}$$

$$T_{\langle -6, 16 \rangle}$$


Problem 3
Finding the Image of a Translation

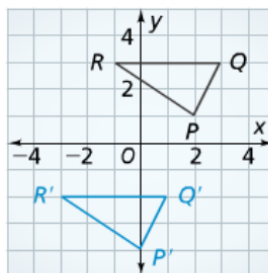

What are the vertices of $T_{\langle -2, -5 \rangle}(\triangle PQR)$? Graph the image of $\triangle PQR$.

$$T_{\langle -2, -5 \rangle}(P) = (2 - 2, 1 - 5), \text{ or } P'(0, -4).$$

$$T_{\langle -2, -5 \rangle}(Q) = (3 - 2, 3 - 5), \text{ or } Q'(1, -2).$$

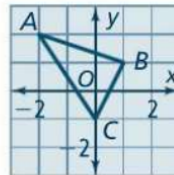
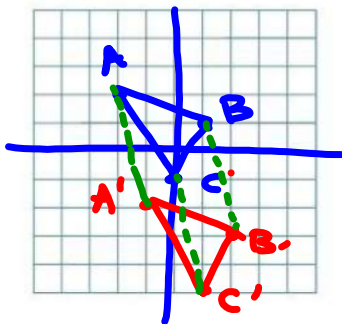
$$T_{\langle -2, -5 \rangle}(R) = (-1 - 2, 3 - 5), \text{ or } R'(-3, -2).$$

To graph the image of $\triangle PQR$, first graph P' , Q' , and R' . Then draw $\overline{P'Q'}$, $\overline{Q'R'}$, and $\overline{R'P'}$.



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Got It? a. What are the vertices of $T_{\langle 1, -4 \rangle}(\triangle ABC)$? Copy $\triangle ABC$ and graph its image.



Reasoning Draw $\overline{AA'}$, $\overline{BB'}$, and $\overline{CC'}$. What relationships exist among these three segments? How do you know?

all same length, ||

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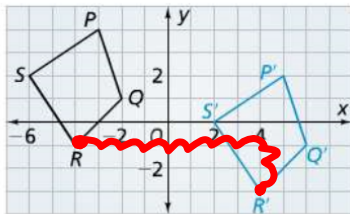


Problem 4

Writing a Rule to Describe a Translation



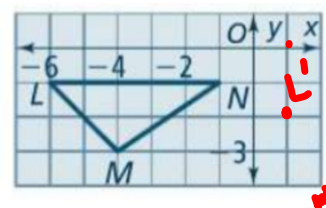
What is a rule that describes the translation that maps $PQRS$ onto $P'Q'R'S'$?



$T_{\langle 8, -2 \rangle} PQRS$

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Got It? The translation image of $\triangle LMN$ is $\triangle L'M'N'$ with L' $(1, -2)$, M' $(3, -4)$, and N' $(6, -2)$. What is a rule that describes the translation?



$$\begin{array}{l} L(-6, -1) \quad L'(1, -2) \\ M(-4, -3) \quad M'(3, -4) \\ N(-2, -1) \quad N'(6, -2) \end{array}$$

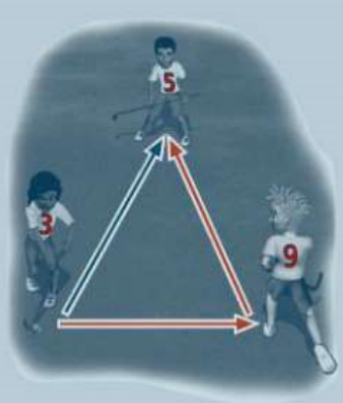
$$T_{\langle 7, -1 \rangle} LMN$$

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A **composition of transformations** is a combination of two or more transformations. In a composition, you perform each transformation on the image of the preceding transformation.

In the diagram at the right, the field hockey ball can move from Player 3 to Player 5 by a direct pass. This translation is represented by the blue arrow. The ball can also be passed from Player 3 to Player 9, and then from Player 9 to Player 5. The two red arrows represent this composition of translations.

In general, the composition of any two translations is another translation.



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 **Problem 5** Composing Translations



Chess The diagram at the right shows two moves of the black bishop in a chess game. Where is the bishop in relation to its original position?



$T \langle -4, 4 \rangle$
 $T \langle 2, 2 \rangle$
 $T \langle -2, -2 \rangle$

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Got It? In Problem 5, the bishop next moves 3 squares left and 3 squares down.
Where is the bishop in relation to its original position?



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hw 9.1 #s 1-2, 5-13, 15, 17-18, 27-28

