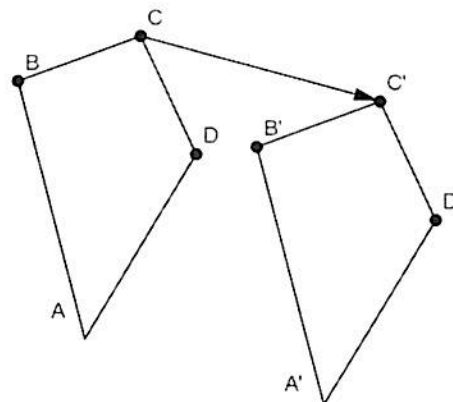


AIM: HOW DO WE CONSTRUCT TRANSLATIONS?

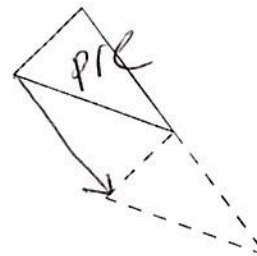
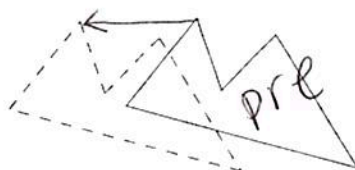
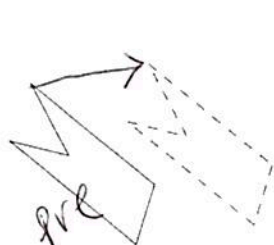
RECALL:

- Translations slide a figure a distance horizontally and a distance vertically.
- If we are working off the coordinate plane, we define the distance translated using VECTORS.
- In the figure below, quadrilateral $ABCD$ has been translated the same distance and same direction along vector $\overrightarrow{CC'}$.
- *Notice that the distance and direction from each vertex (point) to its corresponding vertex on the image are identical to that of $\overrightarrow{CC'}$.
- Quadrilateral $ABCD$ is congruent to quadrilateral $A'B'C'D'$ because translations are rigid motions that preserve distance and angle measurement.



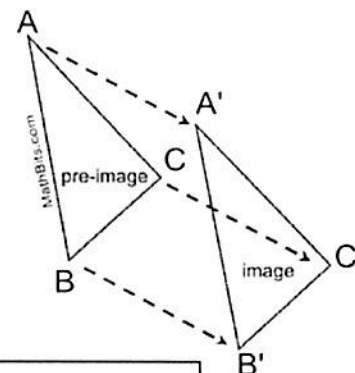
NOTATION: $T_{\overrightarrow{CC'}}$

Given the diagrams below, the pre-image is the solid image and its image is the dotted image. Draw the vector that defines each translation below.



Properties that are preserved under a translation from pre-image to the image:

1. Distance (lengths of segments are the same)
2. Angle measurement (angles stay the same)
3. parallelism (things that were parallel are still parallel)
4. collinearity (points on a line, remain on the line)
5. orientation (lettering order remains the same)



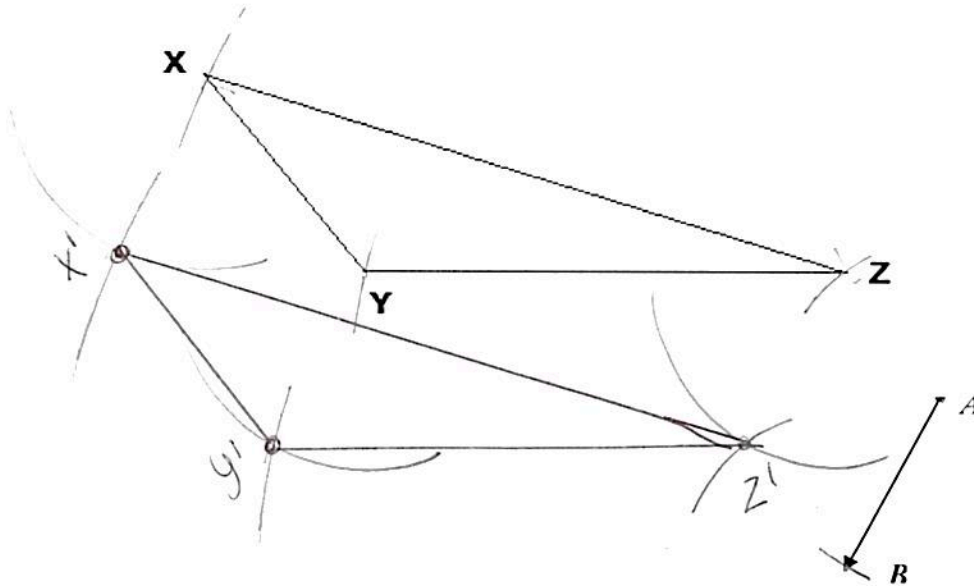
In this translation that maps $\triangle ABC$ to $\triangle A'B'C'$, the distances from the pre-image points to the image points equal and the segments representing these distances are parallel.

CONCLUSION: $\overline{AA'} \cong \overline{BB'} \cong \overline{CC'}$ and $\overline{AA'} \parallel \overline{BB'} \parallel \overline{CC'}$

STEPS FOR CONSTRUCTING A TRANSLATION:

1. Open compass from A to B (needle on A).
2. Construct circle X, center X, radius AB
3. Construct circle Y, center Y, radius AB
4. Construct circle Z, center Z, radius AB
5. Open compass from A to X (needle on A).
6. Keeping width from step 5, Slide Needle to B, construct circle B with radius AX.
7. Open compass from A to Y (needle on A).
8. Keeping width from step 7, Slide Needle to B, construct circle B with radius AY.
9. Open compass from A to Z (needle on A).
10. Keeping width from step 9, Slide Needle to B, construct circle B with radius AZ.
11. Construct the translated triangle by connecting the intercepted arcs.

Use your compass and straightedge to apply $T_{\overline{AB}}$ to $\triangle XYZ$.

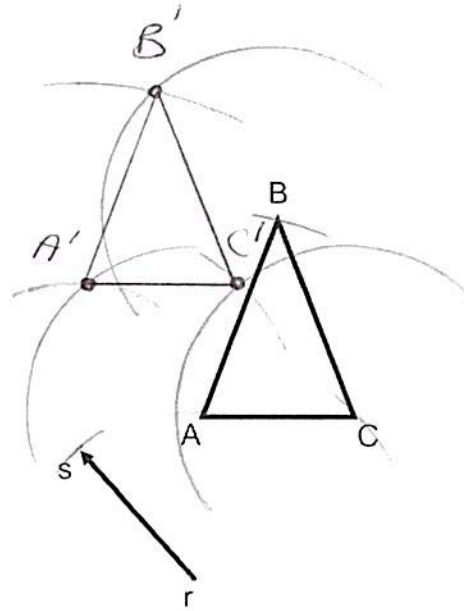


Is $\triangle XYZ \cong \triangle X'Y'Z'$? Explain your answer.

yes! A translation is a rigid motion which preserves distance & \neq measurement. A translation maps $\triangle XYZ$ onto $\triangle X'Y'Z'$.

PRACTICE:

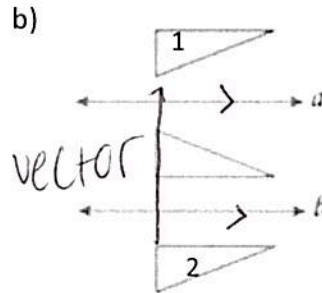
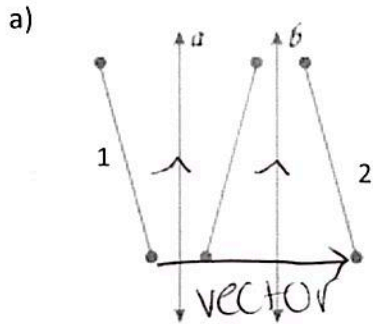
1. Use your compass and straightedge to apply $T_{\vec{RS}}$ to $\triangle ABC$.



Is $\triangle ABC \cong \triangle A'B'C'$? Explain your answer.

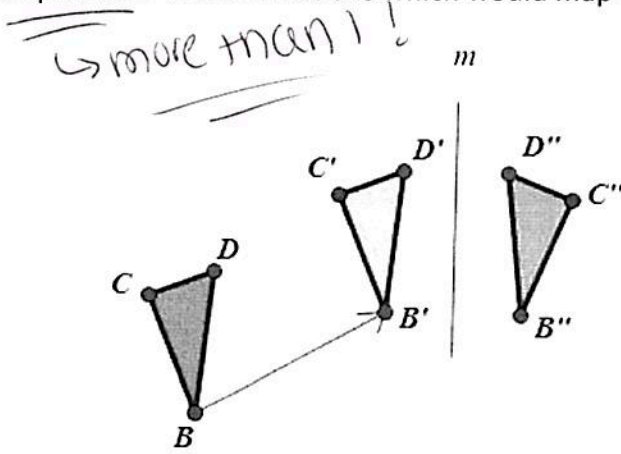
Yes! A translation is a rigid motion which preserves distance and \neq measurement. A translation maps $\triangle ABC$ onto $\triangle A'B'C'$

2. In each figure below $a \parallel b$. Determine whether figure 2 is a translation image of figure 1.



CONCLUSION: If an image is reflected over 2 \parallel lines, the result is the same as a single translation

3. Describe a sequence of transformations which would map $\triangle BCD$ onto $\triangle B''C''D''$.

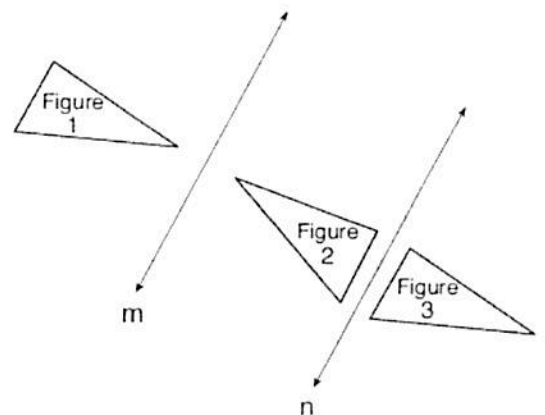


A translation along ~~BB~~ vector $\overrightarrow{BB'}$ such that B maps onto B' followed by a reflection over line m such that $\triangle B'C'D'$ maps onto $\triangle B''C''D''$. $\triangle BCD \cong \triangle B''C''D''$ b/c a translation + a reflection are rigid motions which preserve distance + angle measurement.

4. In the diagram below, line m is parallel to line n . Figure 2 is the image of Figure 1 after a reflection over line m . Figure 3 is the image of Figure 2 after a reflection over line n .

Which single transformation would carry Figure 1 onto Figure 3?

- (1) a dilation
- (2) a rotation
- (3) a reflection
- (4) a translation



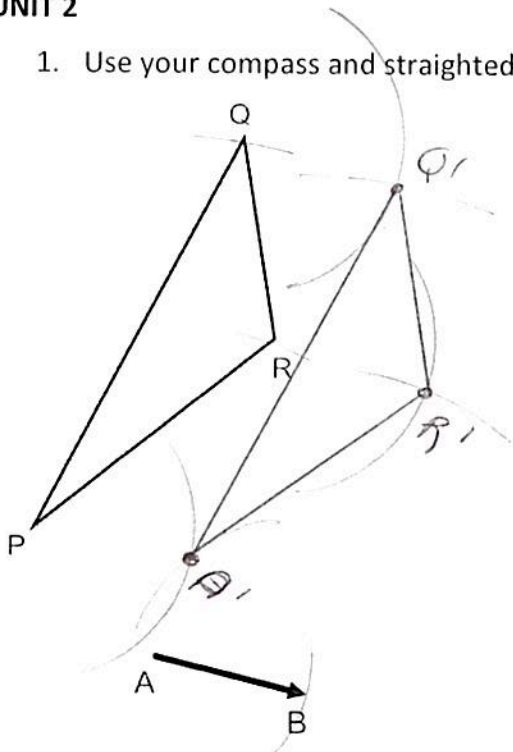
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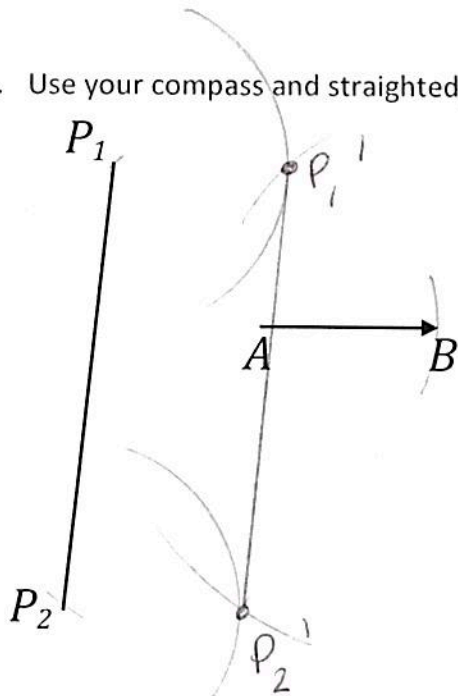
UNIT 2

LESSON 4 HOMEWORK

1. Use your compass and straightedge to apply $T_{\overline{AB}}$ to $\triangle XYZ$.



2. Use your compass and straightedge to apply $T_{\overline{AB}}$ to segment P_1P_2 .



3. Triangle $A'B'C'$ is the image of triangle ABC after a translation of 2 units to the right and 3 units up. Is triangle ABC congruent to triangle $A'B'C'$? Explain why.

yes, $\triangle ABC \cong \triangle A'B'C'$ b/c a translation is a rigid motion and preserves distance + measurement

