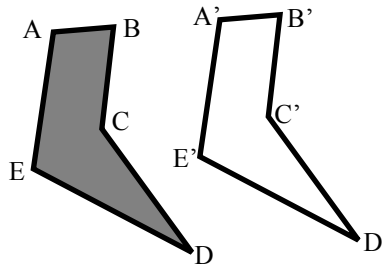
Name:_____ Date:_____ Period:_____ Score:_____

Isometric Transformations

Isometric Transformation: An isometric transformation is a transformation that preserves the distances and angles between a pre-image and its image. Put simply, in an isometric transformation the image is exactly the same size and shape as its pre-image.

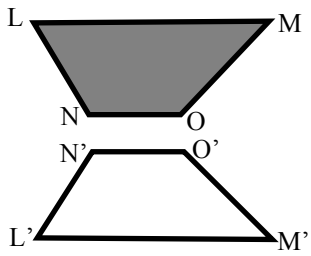
Here are some examples of Isometry…

Example #1



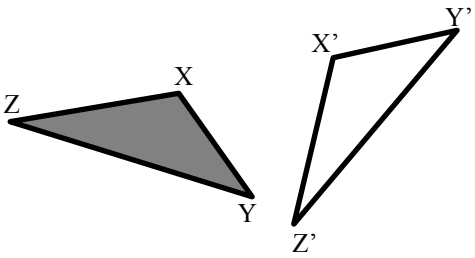
Translation (slide)

Example #2



Reflection (flip or mirror image)

Example #3



Rotation (turn)

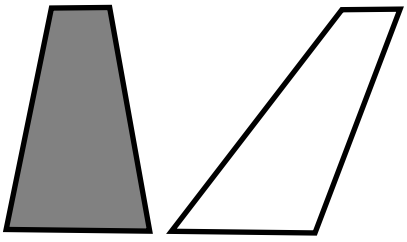
Isometric transformations are more commonly referred to as "**rigid transformations**." That is because the shape of the pre-image does not change when transformed to its image, just like a steel pipe is referred to as rigid because when you move it around it keeps its shape. This is opposed to something like maple syrup, which does not hold its shape very well on its own.

In an isometric or "rigid" transformation, segments are taken to segments of the same measure, and angles are taken to angles of the same measure. That is to say that all the segments in the pre-image are the same length as their corresponding segments in the image. The same goes for the measures of all the pairs of corresponding angles. For example in #3 above, $|xy|=|x'y'|$, $|YZ|=|Y'Z'|$, $|ZX|=|Z'X'|$, $|\angle X|=|\angle X'|$, $|\angle Y|=|\angle Y'|$, and $|\angle Z|=|\angle Z'|$. Also, parallel lines are taken to parallel lines and perpendicular lines are taken to perpendicular lines. We will explore this more in another section.

Non-Isometric Transformation: A non-isometric transformation is a transformation that does not preserve the distances and angles between a pre-image and its image. So, in a non-isometric transformation the image is a different size or shape than its pre-image.

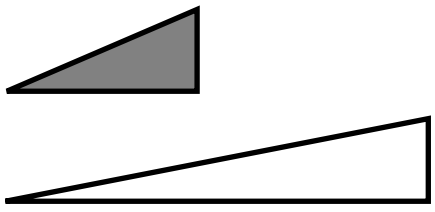
Here are some examples of non-isometry…

Example #1



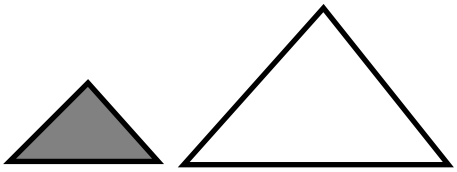
Shear (pushed over)

Example #2



Stretch (Pulled)

Example #2

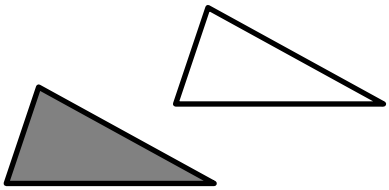


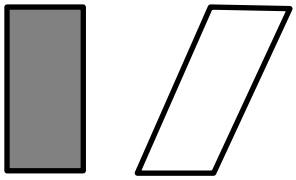
Dilation (changed size)

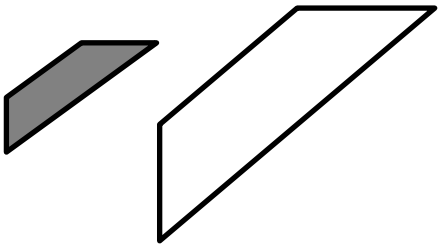
There are a lot more examples of non-isometric transformations but the above are the more recognizable examples.

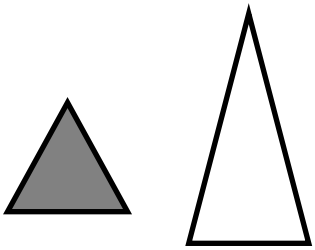
Name:_____ Date:_____ Period:_____ Score:_____

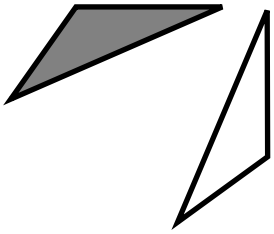
Directions: State if each pair of figures, a pre-image (shaded) and its image, are an isometric or non-isometric transformation.

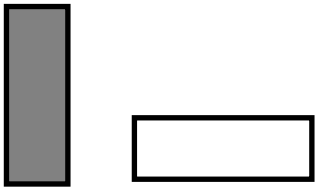
1. 

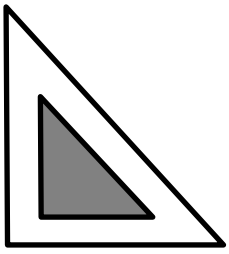
2. 

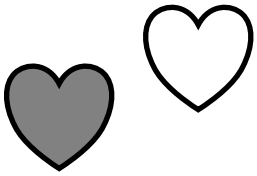
3. 

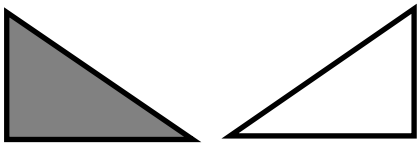
4. 

5. 

6. 

7. 

8. 

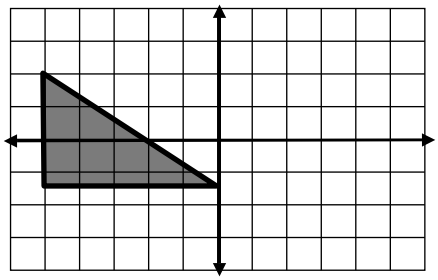
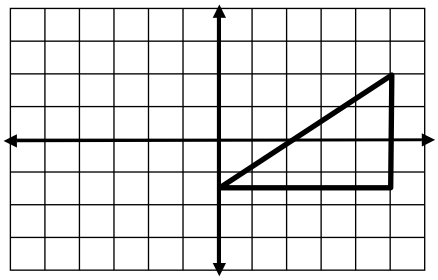
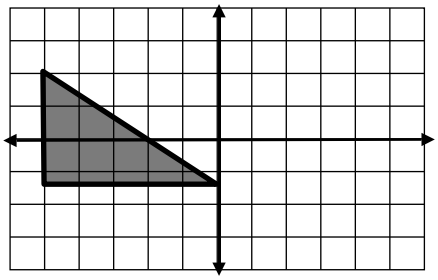
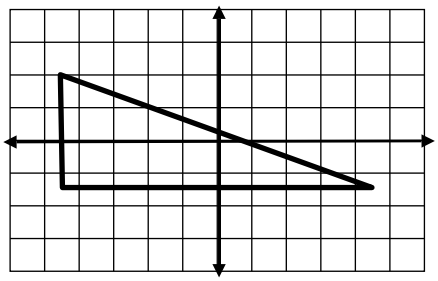
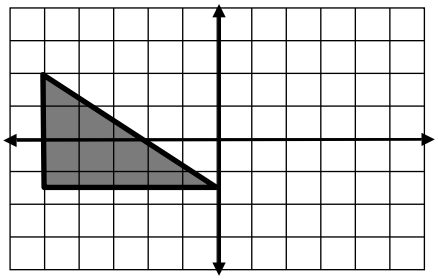
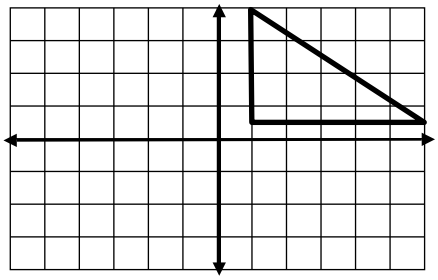
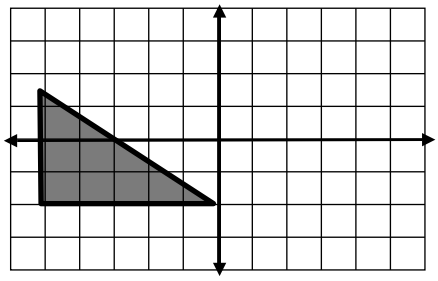
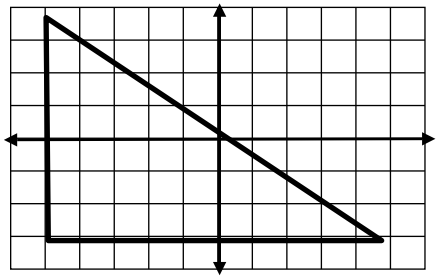
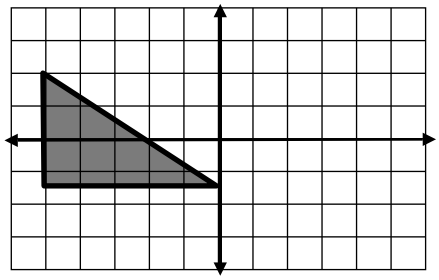
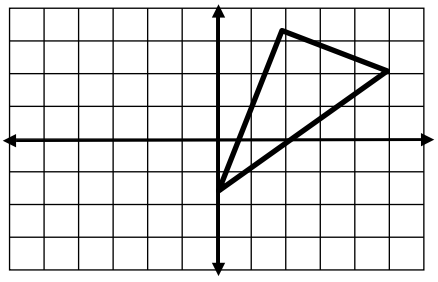
9. 

10. Draw a pair of figures that are isometric and a second pair that are not.

11. Elsa claims that all squares are isometric, but Anna says they are not. Who is correct? Explain your answer and draw a picture.

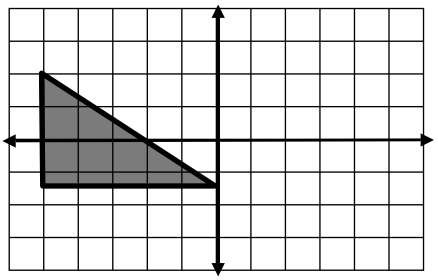
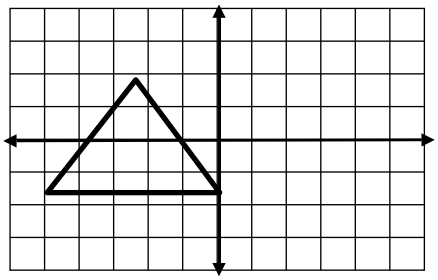
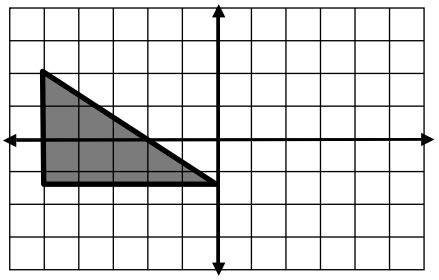
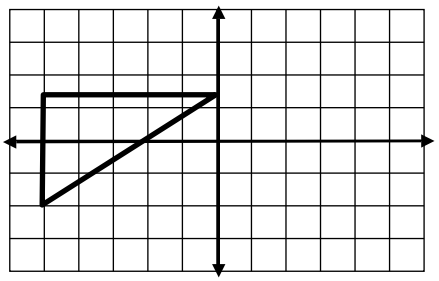
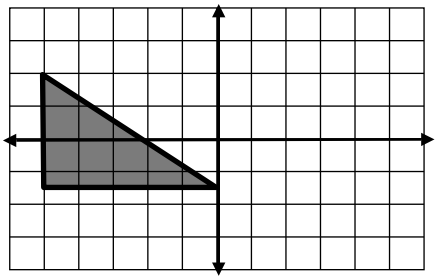
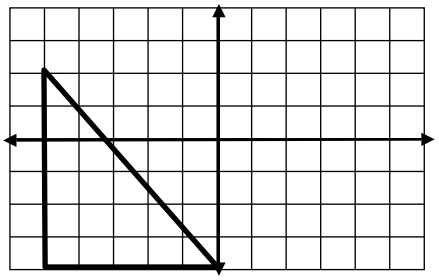
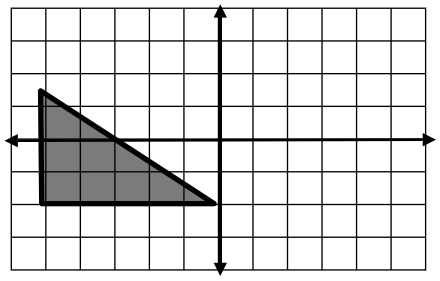
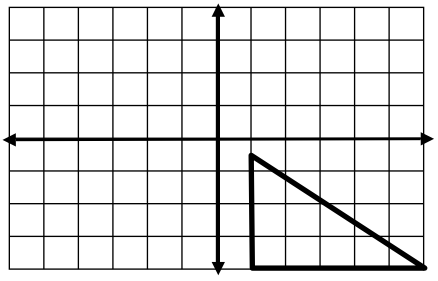
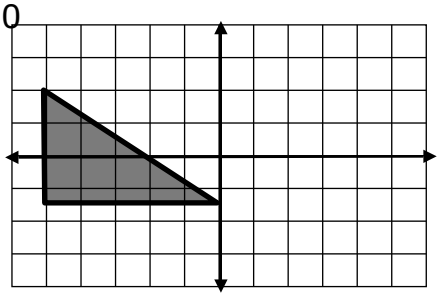
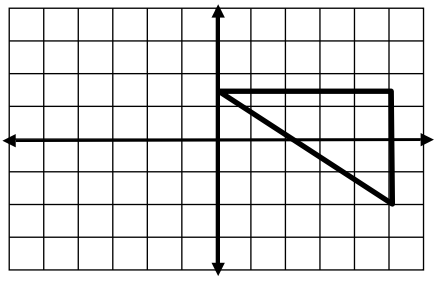
Name:_____ Date:_____ Period:_____ Score:_____

Directions: For each row circle all of the words that describe the transformation between the pre-image and the image.

Pre-image	Image	Circle all that apply
1 		Isometric Non Isometric Translation Rotation Reflection Dilation Stretch Shear
2 		Isometric Non-Isometric Translation Rotation Reflection Dilation Stretch Shear
3 		Isometric Non-Isometric Translation Rotation Reflection Dilation Stretch Shear
4 		Isometric Non-Isometric Translation Rotation Reflection Dilation Stretch Shear
5 		Isometric Non-Isometric Translation Rotation Reflection Dilation Stretch Shear

Name:_____ Date:_____ Period:_____ Score:_____

Directions: For each row circle all of the words that describe the transformation between the pre-image and the image.

Pre-image	Image	Circle all that apply
6 		Isometric Non-Isometric Translation Rotation Reflection Dilation Stretch Shear
7 		Isometric Non-Isometric Translation Rotation Reflection Dilation Stretch Shear
8 		Isometric Non-Isometric Translation Rotation Reflection Dilation Stretch Shear
9 		Isometric Non-Isometric Translation Rotation Reflection Dilation Stretch Shear
10 		Isometric Non-Isometric Translation Rotation Reflection Dilation Stretch Shear