

Transformations

- Symmetry
 - Line
 - Point
- Line reflections
 - x-axis, y-axis, $y = x$, $y = -x$
 - Any line
 - Constructing the line of reflection
- Rotations
 - Through the origin
 - Through any point - finding the point
 - Rotational symmetry
 - Identity symmetry
- Translations
 - Vector
 - Finding the translation
- Dilations
 - Reduction/contraction
 - Expansion/enlargement
 - Scale factor
 - Center of dilation
- Compositions of transformations
 - Finding the sequence of transformations
 - Glide Reflections
 - Identifying transformations
 - Identifying compositions

Introduction to Translations

Transformation: a function that moves or changes a figure in some way to produce a new figure (called an image)

Rigid Motion: a transformation that preserves length and angle measure.

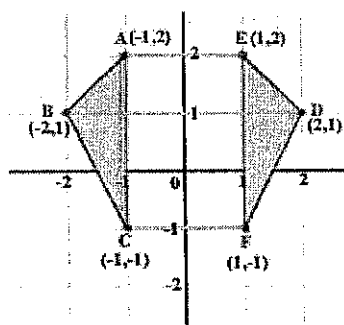
Common Transformations:

1. reflections
2. translations
3. rotations
4. dilations (Not a rigid motion)

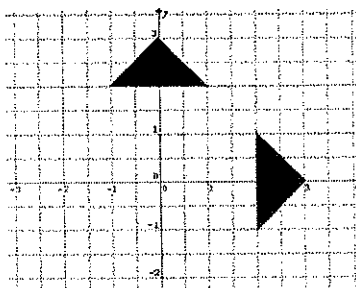
Preimage: the original figure

Image: the transformed figure

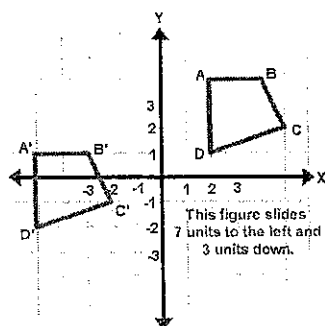
Reflection:



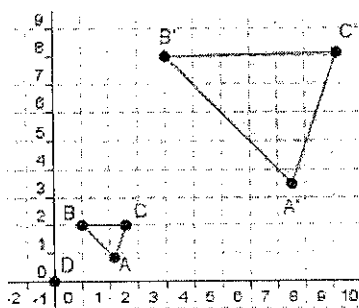
Rotation:



Translation:



Dilation:

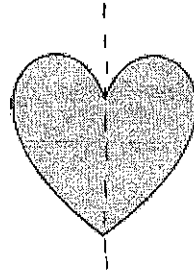


Line Symmetry

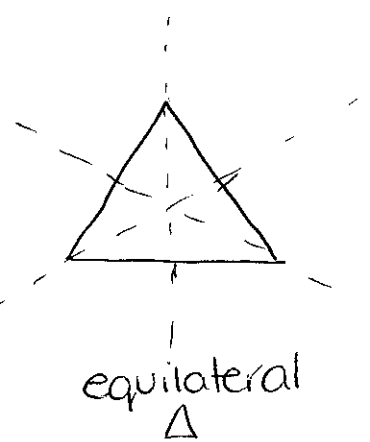
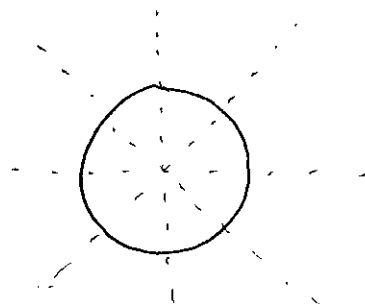
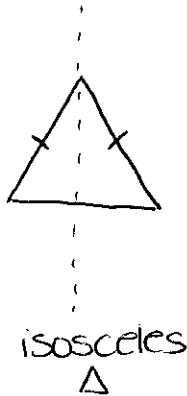
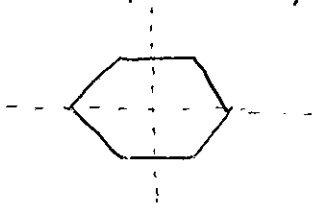
Line Symmetry:

a figure has line symmetry when it can be mapped onto itself by a reflection in a line

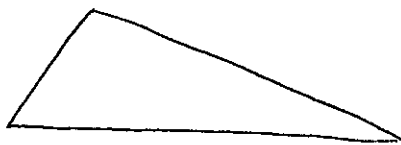
Example:



Examples of line symmetry:



NON-Examples of line symmetry:



scalene △

- A shape or object may have more than one line of symmetry, in fact they may have many.
- A simple test to determine if an object has line symmetry is to...

draw in a line of symmetry

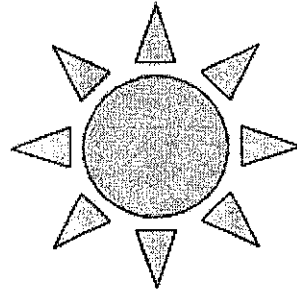
fold the object in half

Point Symmetry

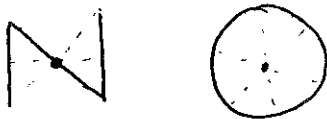
Point Symmetry:

when every part has a matching part
(same distance from the central point but in the opposite direction)

Example:



Examples of point symmetry:



NON-Examples of point symmetry:

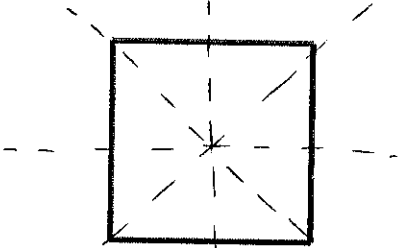


- A simple test to determine if an object has point symmetry is to...
rotate (turn) an object 180° (the figure should be the same)
- A shape or figure that has point symmetry is unchanged in appearance by a 180 degree rotation.

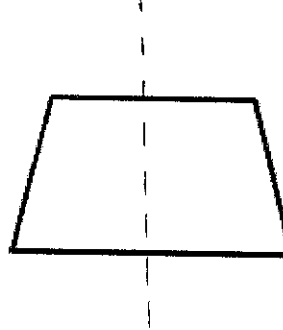
Practice Problems:

Draw all lines of symmetry for each figure. If none, state none.

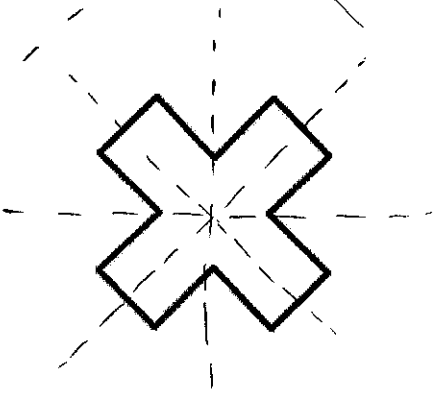
1.



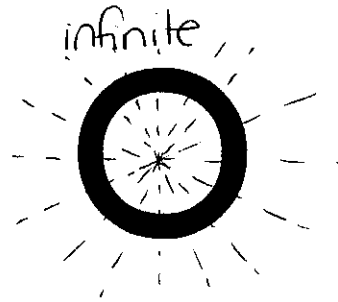
2.



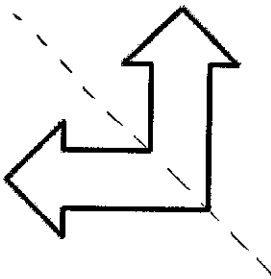
3.



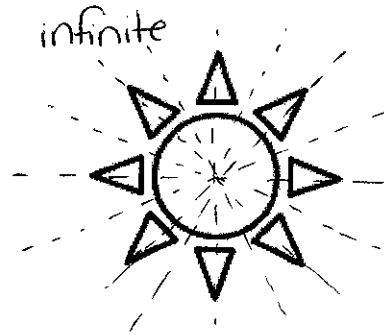
4.



5.



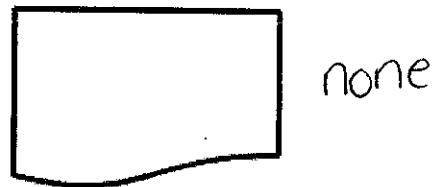
6.



7.



8.

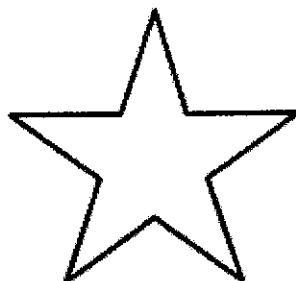


Determine whether or not the figures have point symmetry. If they do, draw the point. If they do not, state why.

9.

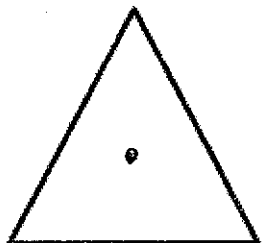


10.

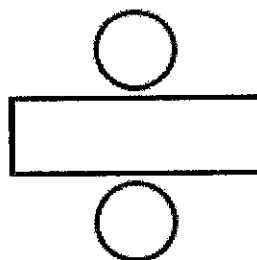


no

11.

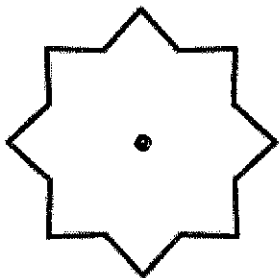


12.



no

13.

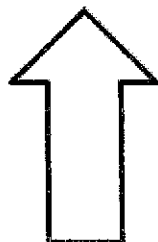


14.



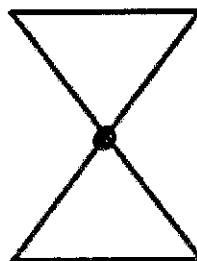
no

15.



no

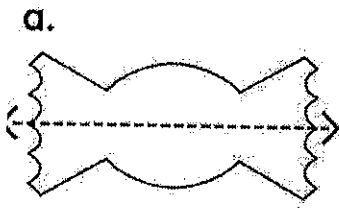
16.



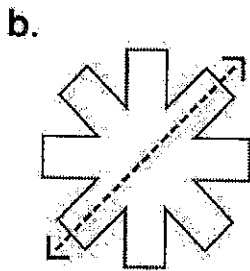
Name: _____

Symmetry

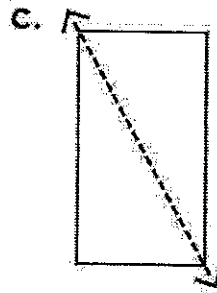
Tell whether the dotted line on each shape represents a line of symmetry. Write yes or no.



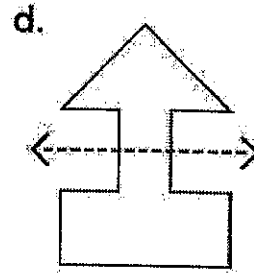
yes



yes

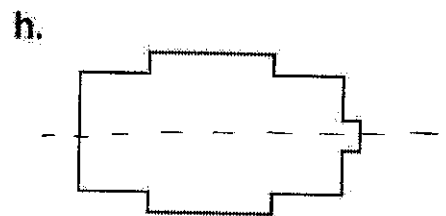
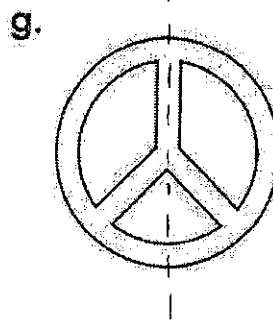
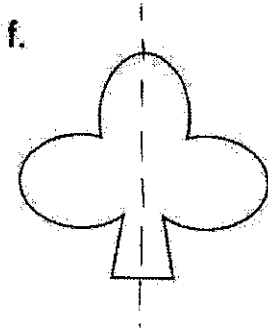
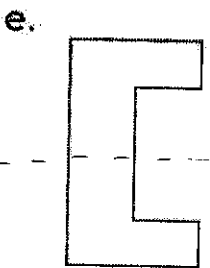


no

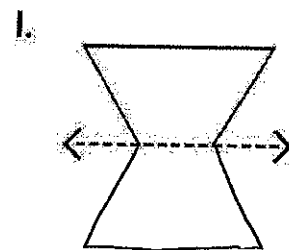
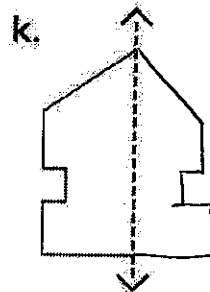
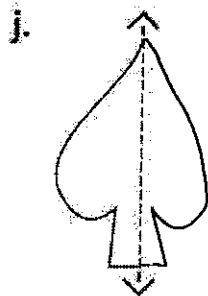
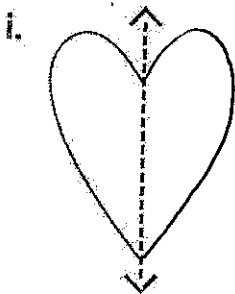


no

Draw a line of symmetry on each shape.



Draw the second half of each symmetrical shape.



1

2

3

4

5

6

7

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Transformations

Any image in a plane could be altered by using different operations, or transformations. Here are the four most common types:

Pre-image (transformation) → Image



Translation is when we slide a figure in any direction.



Reflection is when we flip a figure over a line.

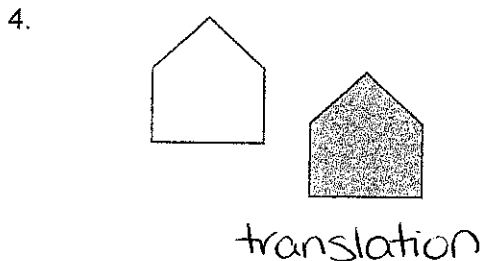
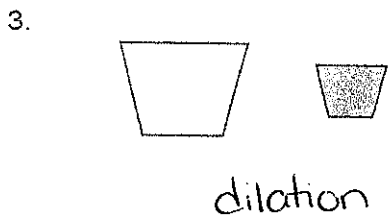
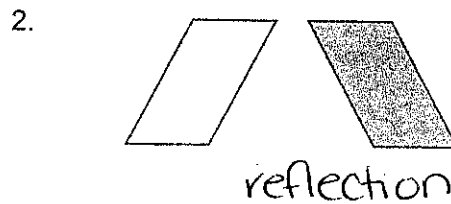
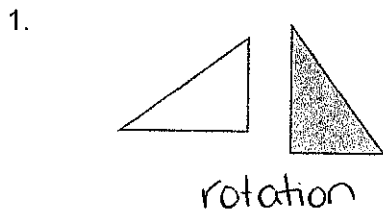


Rotation is when we rotate a figure a certain degree around a point.



Dilation is when we enlarge or reduce a figure.

Directions: Tell whether the shaded figure (image) is a translation, reflection, rotation, or dilation of the nonshaded (pre-image) figure.

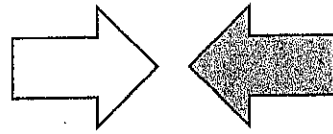


5.



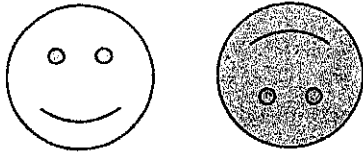
dilation

6.



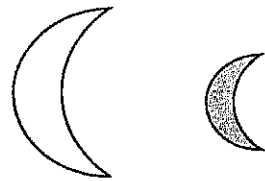
reflection

7.



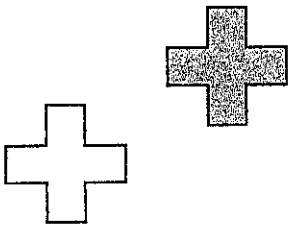
rotation

8.



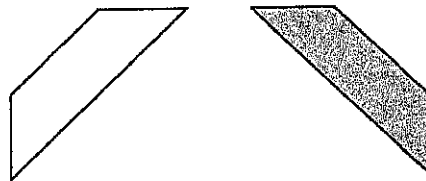
dilation

9.



translation

10.



reflection