

Read the instructions on the reverse

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Worksheet title

1-USING THE SET SQUARES:  
Triangles and parallels

Read the instructions on the reverse

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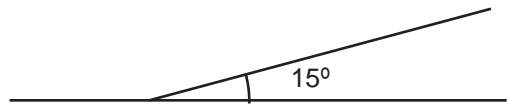
Worksheet title
2-CIRCLES PATTERN

Using the triangles fill in the three boxes below with parallels following the directions given. Try to keep the same distance between the straight lines and finish the exercise with black ink.

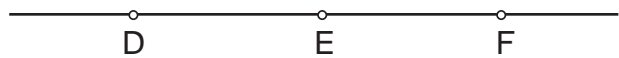
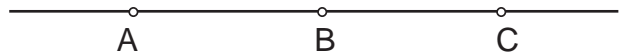
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In this exercise you need to draw the angles requested for each given point helping yourself with the angles the triangles offer.

**WARNING!!:** It is important that you label each angle with a little arc and you note its length in degrees. EXAMPLE:



- A-  $15^\circ$  (45-30 ó 60-45)
- B-  $30^\circ$
- C-  $45^\circ$
- D-  $60^\circ$
- E-  $75^\circ$  (45+30)
- F-  $90^\circ$
- G-  $105^\circ$  (45+60)
- H-  $120^\circ$  (supplementary of 60)
- I -  $135^\circ$  (90+45, supplementary of 45)
- J-  $150^\circ$  (60+90, supplementary of 30)



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**WARNING!!:** You must enhance the final result or solution of each problem with black ink and be VERY CAREFUL with being neat and clear in your worksheet final presentation.

Following you can see four line segments AB, CD, EF and GH. Using compass and ruler carry out the operations or exercises requested.

DO NOT USE THE RULER TO TAKE DIMENSIONS, ONLY TO TRACE STRAIGHT LINES. USE THE COMPASS TO TAKE AND COPY THE LENGTHS.



Copy the corresponding line segments from each given point.



From the point P trace the segment  $AD = AB + CD$  (Place the location of A on the given point P)



From the point Q trace the segment  $CG = CD - GH$  (Place the location of C on the given point Q)



From the point R trace the segment  $AF = AB + CD + EF$  (Place the location of A on the given point R)



From the point S trace the segment  $AB + CD - GH$  (Place the location of A on the given point S)



From the given point T trace the segment  $AB \times 3$  (place the location of A on the given point T)



From the given point W copy the line segment CD and divide it into two equal parts. In order to do that you need to find the Midpoint M drawing the line segment perpendicular bisector. (place the location of C on the given point W)



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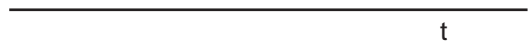
Draw the AB line segment bisector.

Trace the perpendicular line to the given one, r, through P, a point onto it.

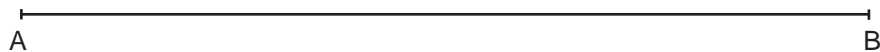


Trace a parallel line to t through point B.

Trace the perpendicular line to the given line, s, through the outer point A.



Divide the segment to line AB into 9 equal parts.



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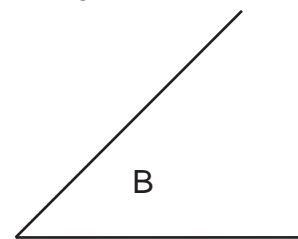
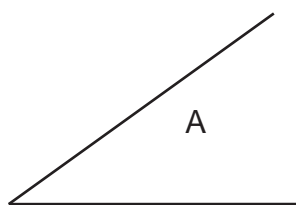
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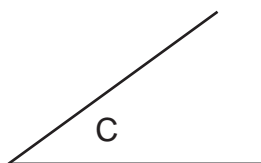
**WARNING!!:** You must enhance the final result or solution of each problem with black ink and be VERY CAREFUL with being neat and clear in your worksheet final presentation.

With compass and ruler, copy the angle A on the straight line r locating the vertex in point V.

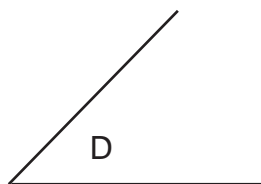
Trace the angle B bisector.



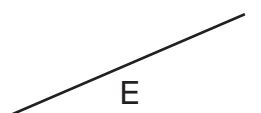
Below on the left three angles: C, D and E are given. Carry out the operations requested on each straight line. It is important that you label CLEARLY each angle solution.



On the straight line s, placing the vertex in point P, draw the angle C+D.



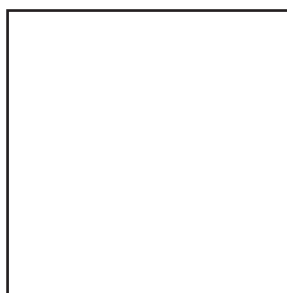
On the straight line t, placing the vertex in point Q, draw the angle D-E.



On the straight line r, placing the vertex in point V, draw the angle C+D-E.



Divide the given square into 9 equal squares. You must divide two of its sides (two that are perpendicular) into three equal parts using thales' theorem and after that trace parallels through the division marks with the triangles (set squares).

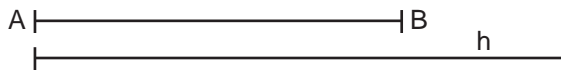


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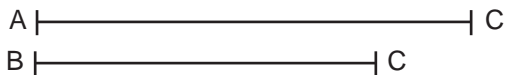
Draw an equilateral triangle given the side AB:



on the given straight line, draw a right triangle given the hypotenuse h and a leg AB:



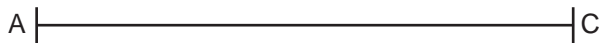
On the given side AB, draw the triangle ABC given the sides AC and BC:



Given the diagonal AC, draw a rectangle from it, given a side AB:



Draw, from the given diagonal AC, a rhombus given its other diagonal BD:



Draw a square out of the given side AB:



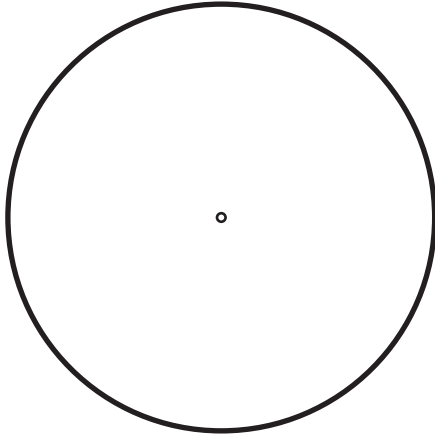
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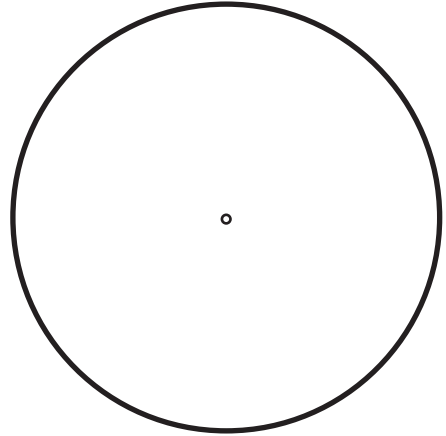
Date

Given the circumscribed circle, inscribe the regular polygons:

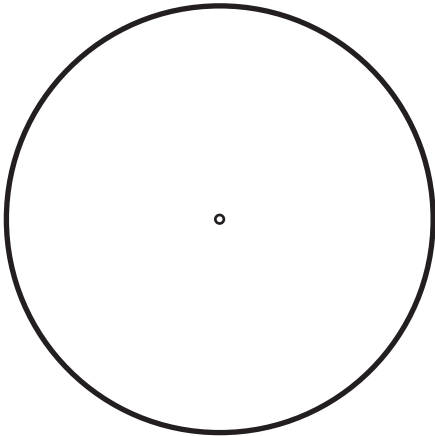
**Equilateral triangle**



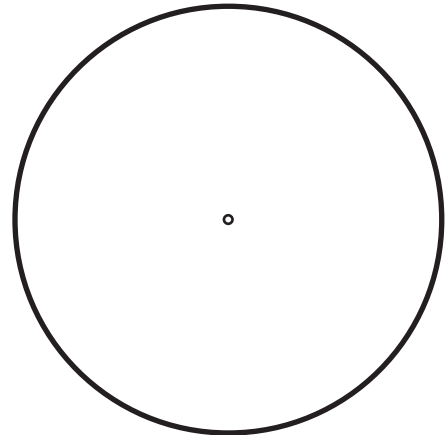
**Square**



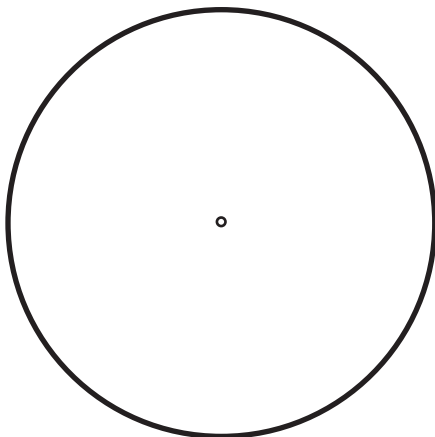
**Pentagon**



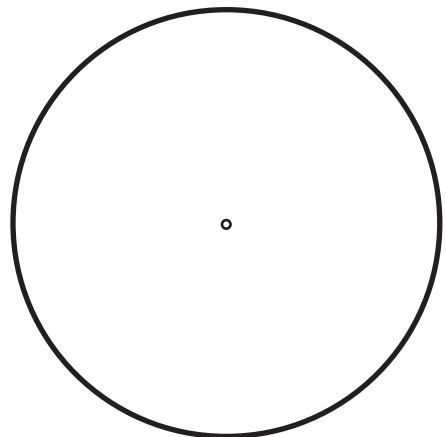
**Hexagon**



**Heptagon**



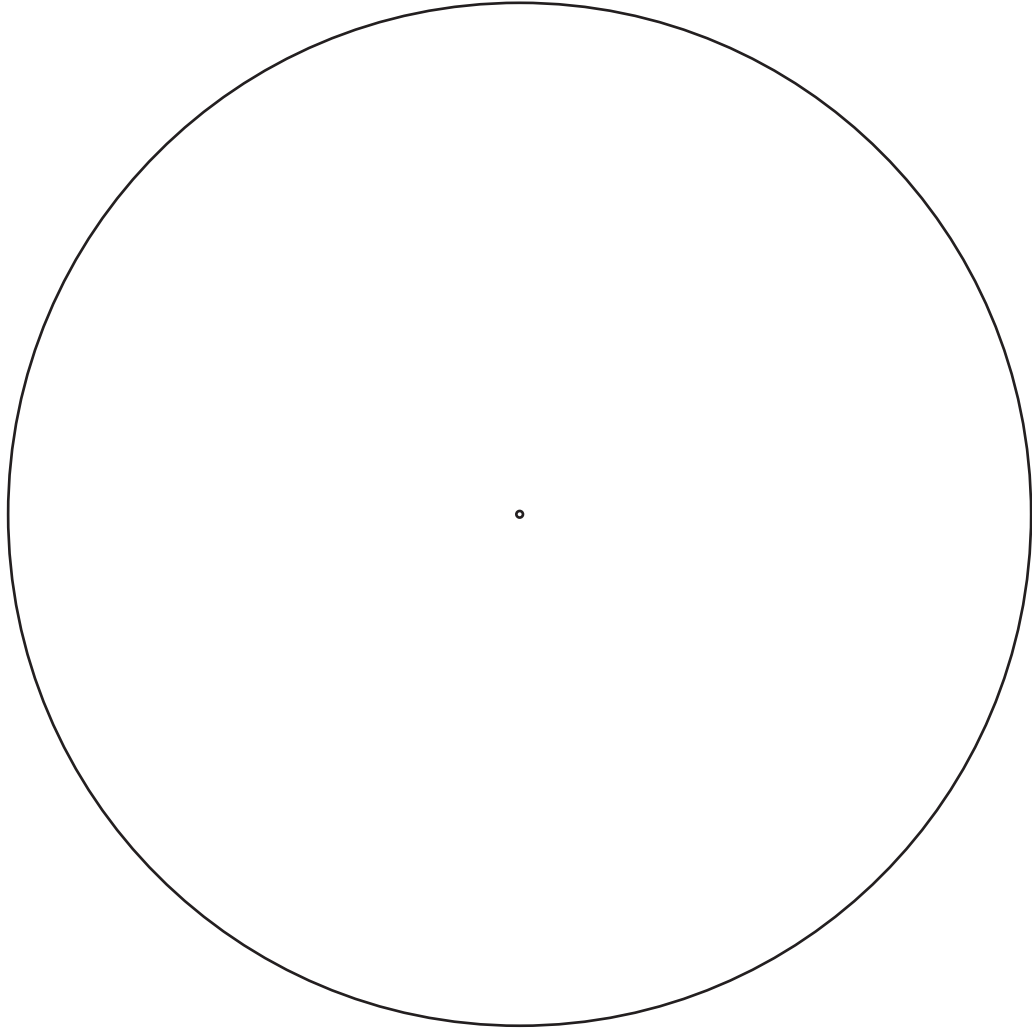
**Octagon**



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Given the circle, inscribe an N (13) sided regular polygon:



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1º ESO

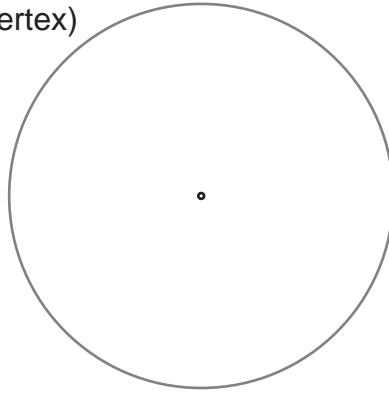


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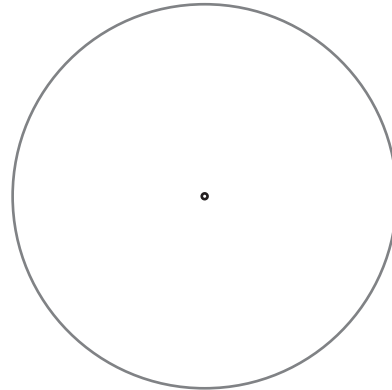
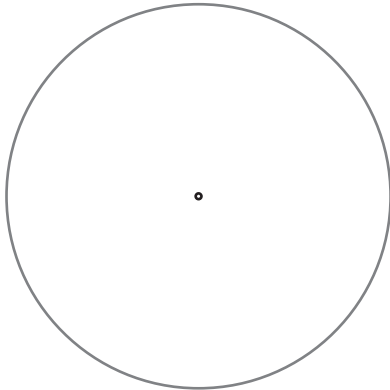
Worksheet title

9-N-sided polygons (standard method)

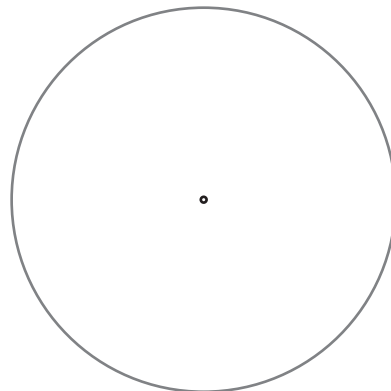
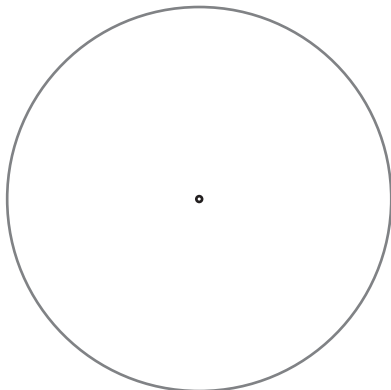
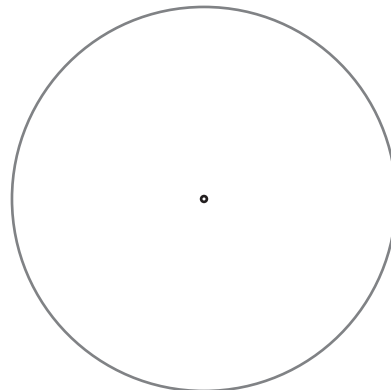
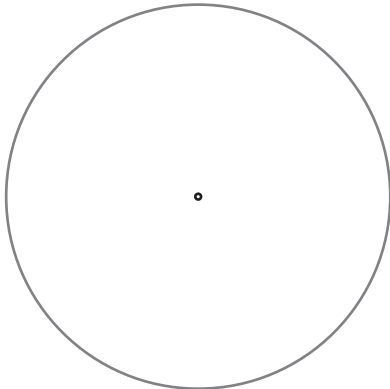
Pentagram:  $5/2$  (skip one vertex)



Heptagon:  $7/2$  (skip one vertex) and  $7/3$  (skip two vertices)



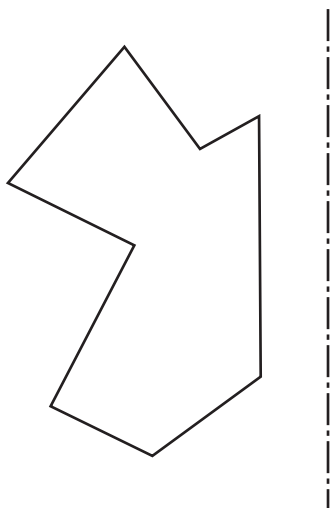
Hendecagon:  $11/2$ ,  $11/3$ ,  $11/4$  y  $11/5$



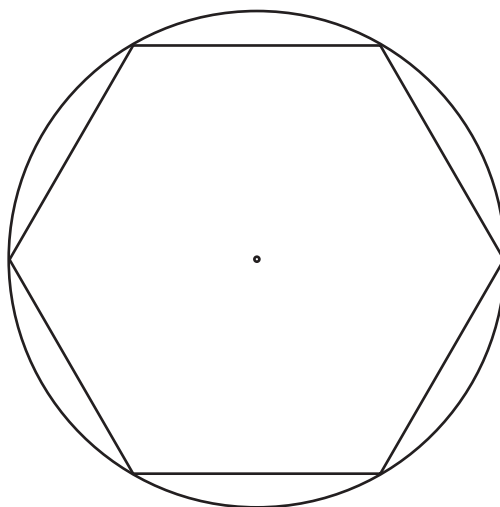
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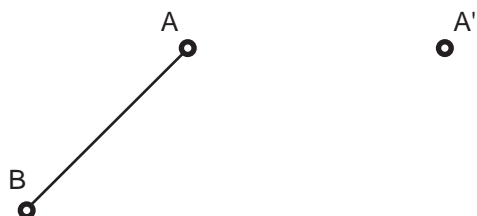
Draw the symmetric figure about the given symmetry axis.



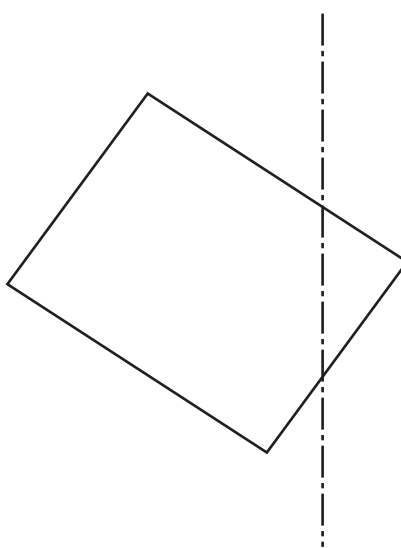
Draw the symmetry axes to the given hexagon.



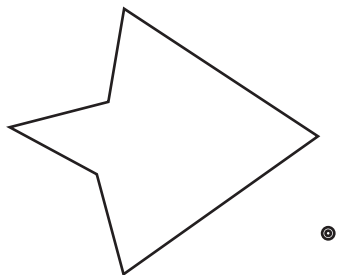
Given the segment AB and a symmetric point A'. Draw the symmetry axis, complete a triangle with a third point C, and draw the symmetric triangle A'B'C'.



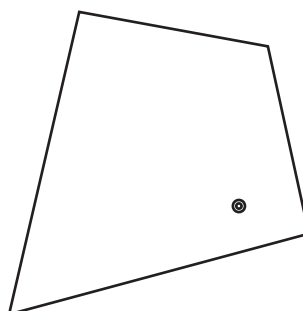
Draw the symmetric quadrilateral.



Draw the symmetric figure around the given symmetry center.



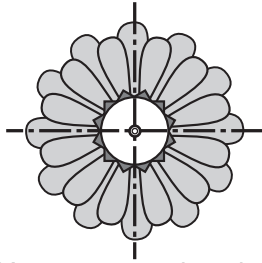
Draw the symmetric figure around the given symmetry center.



Group

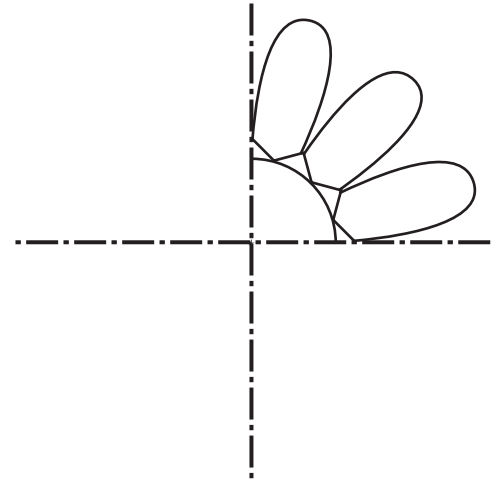
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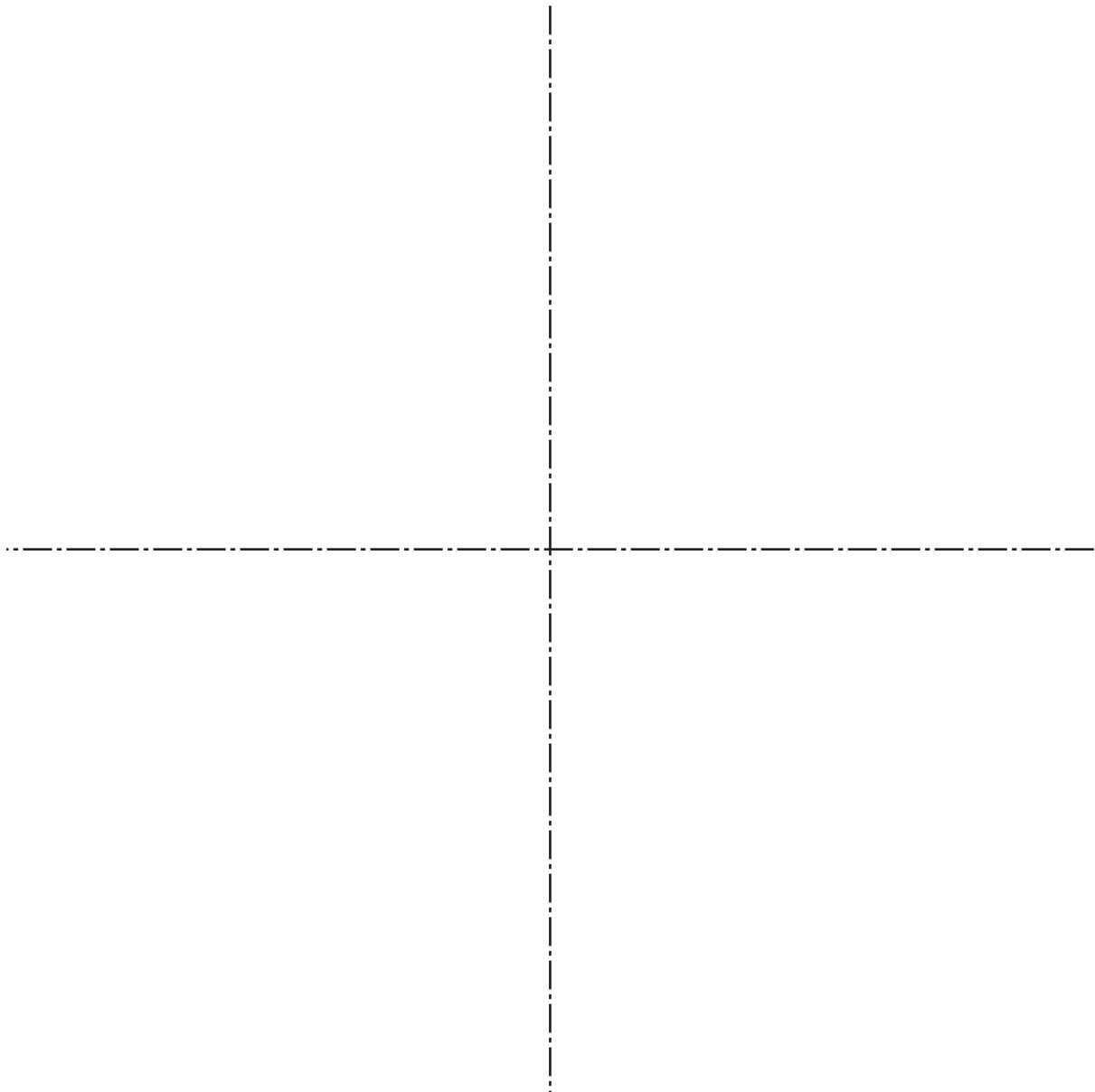
On the left you can see as the flower is divided by two symmetry axes into four symmetric parts. The axes determine the reflexions, and so the image is formed by one part which is reflected four times. (axial symmetry).

At the same time, each element of the image its repeated or reflected, at the same distance, with the same size, and opposite arrangement, but to opposite side of the point where both axes intersect (central Symmetry).



You must complete the small drawing on the right reflecting the given quarter of the drawing. First draw a reflexion of the given part, that way you will have half of the flower. After that reflect that half to complete the drawing. Give color to the result also attending to the reflection rules.

Below you must create your own design. Try to be creative and get an original design, different to the examples. you could draw a wheel, a round stained glass with lots of geometric (or not) elements, etc. Draw first a quarter and then repeat the procedure done in the previous flower example Give color to your design.



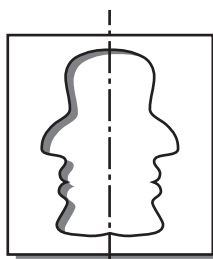
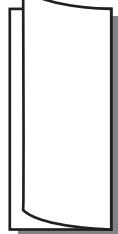
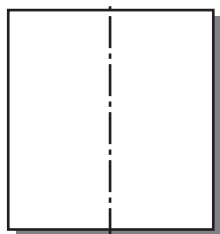
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In this worksheet you are going to do a drawing or design with one or several symmetries or reflections. The main figure of your artwork will be made of at least two halves which must be a reflection of each other.

1st- Cut out a paper sheet so it has the same size that the given space in this worksheet to work (below).

2nd- Fold it in two halves (do it at least in two halves, but you can fold it in more halves afterwards)...

3º- Cut out figures on the fold sides. the more effort and attention given to cutting out, the more interesting will be the result. Think that the figure/s that you cut will reflect about the fold lines when unfolding the paper sheet therefore creating symmetric figures.



4th- Unfold the paper sheet.


5th- Glue the cut out paper on this worksheet. Give color to your design with markers or pencils, do it on the figures as well as on the layout.

To get a perfect symmetry you need to attend to the reflection rules also when coloring the result of the cut out.

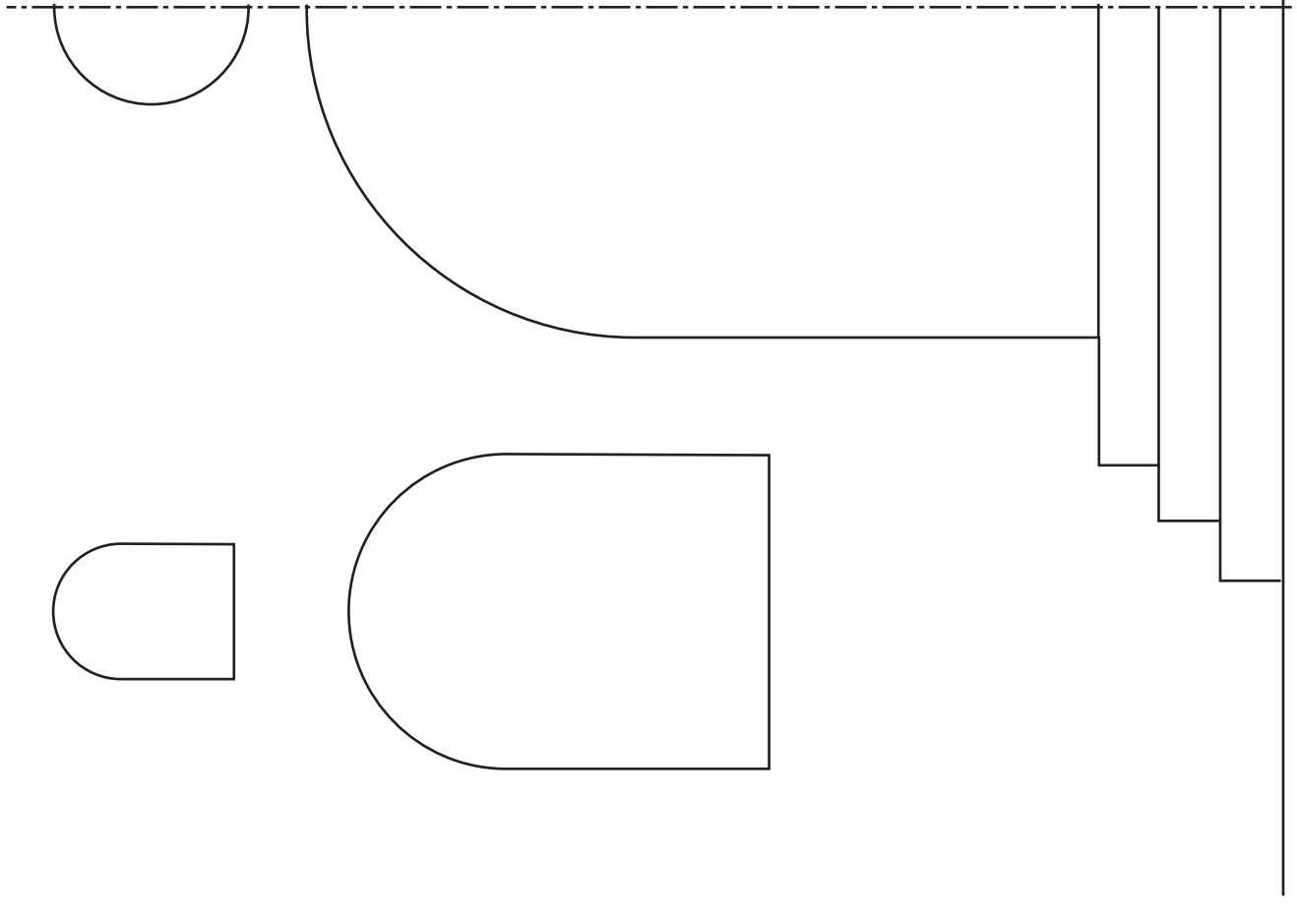
Please be more original than the example above. These drawings are only meant to give you an idea of the process. You can make a better and more complicated design. Fold the paper at least twice and you'll get a much better result attending to symmetries.

Large empty rectangular area for drawing and coloring the papercraft.

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1º ESO	 laslaminaS.es	Worksheet title
		13- Symmetries colored papercraft

Use line symmetry to complete this facade drawing or front view of a building. Add decorative elements using different shapes and colors which must also follow the line symmetry rules. You can carry out the symmetry either with compass and ruler or just as an apparent symmetry without technical drawing supplies.



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