

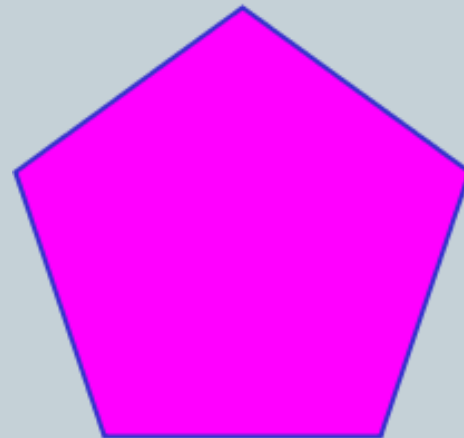
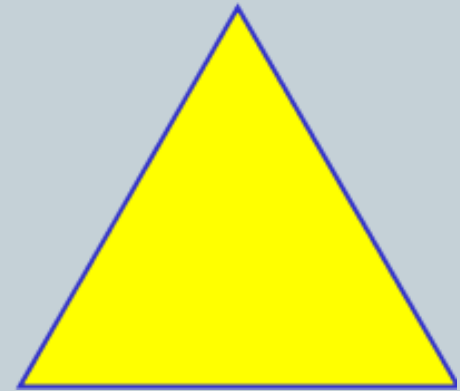
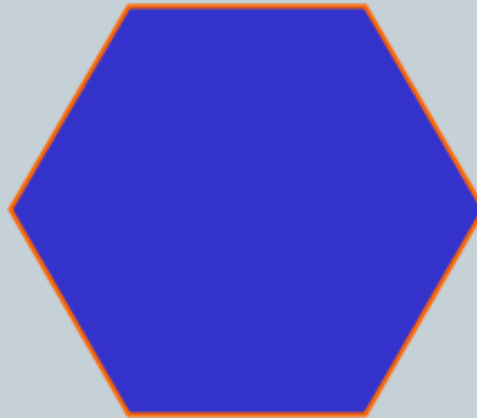
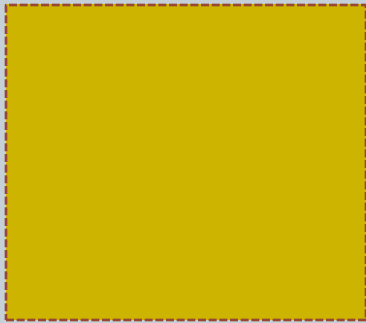
POLYGONS



A polygon is a closed plane figure made up of several line segments that are joined together. The sides do not cross one another. Exactly two sides meet at every vertex.



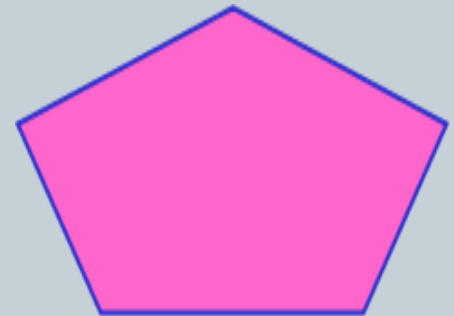
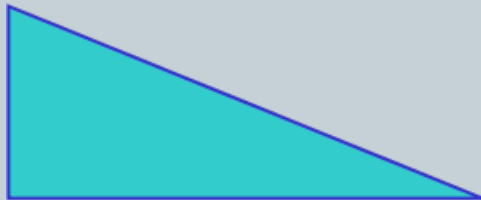
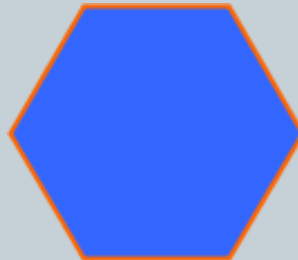
Vertex : is the point at which two sides of a polygon meet.



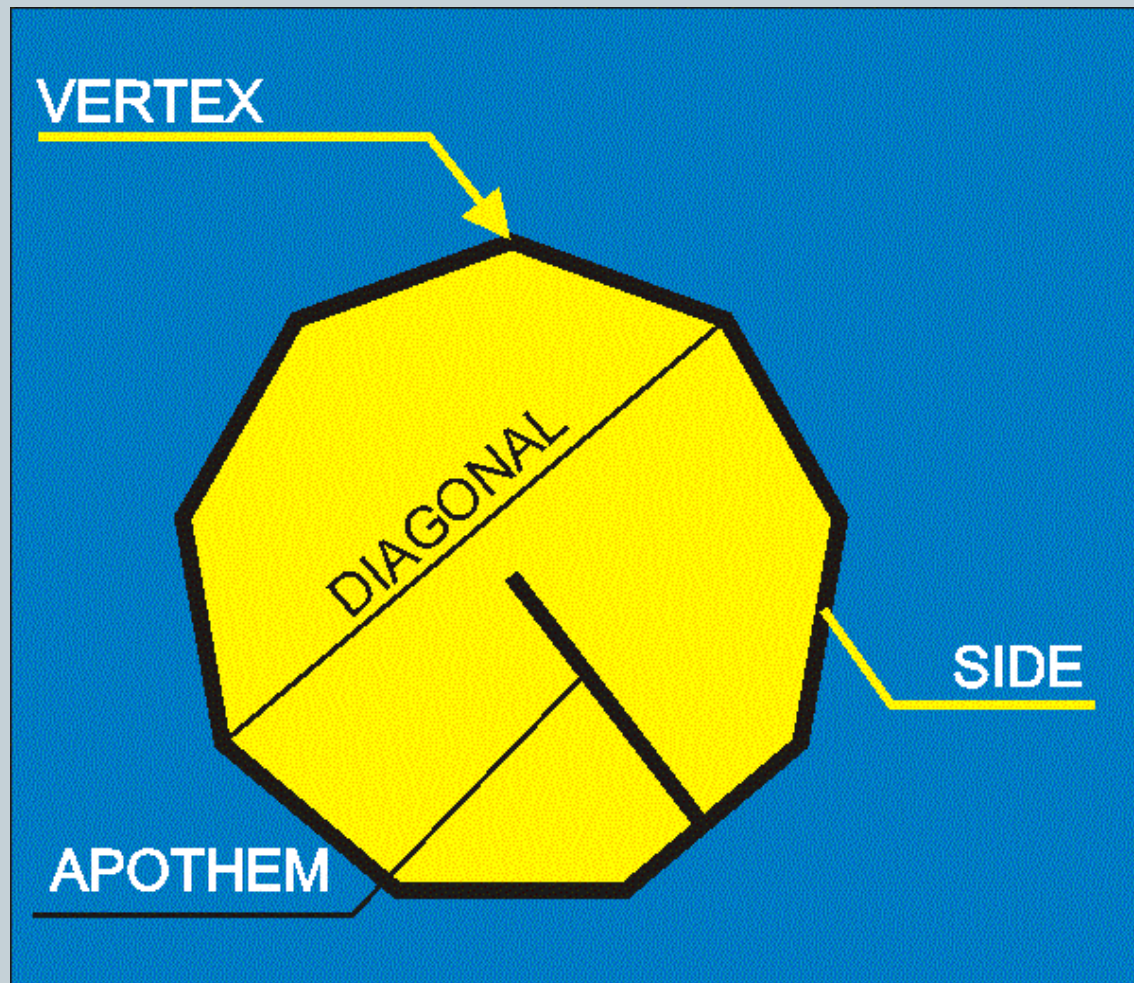
TYPES OF POLYGONS



- Regular or Irregular
- If all angles are equal and all sides are equal, then it is **regular**, otherwise it is **irregular**



ELEMENTS OF A POLYGON



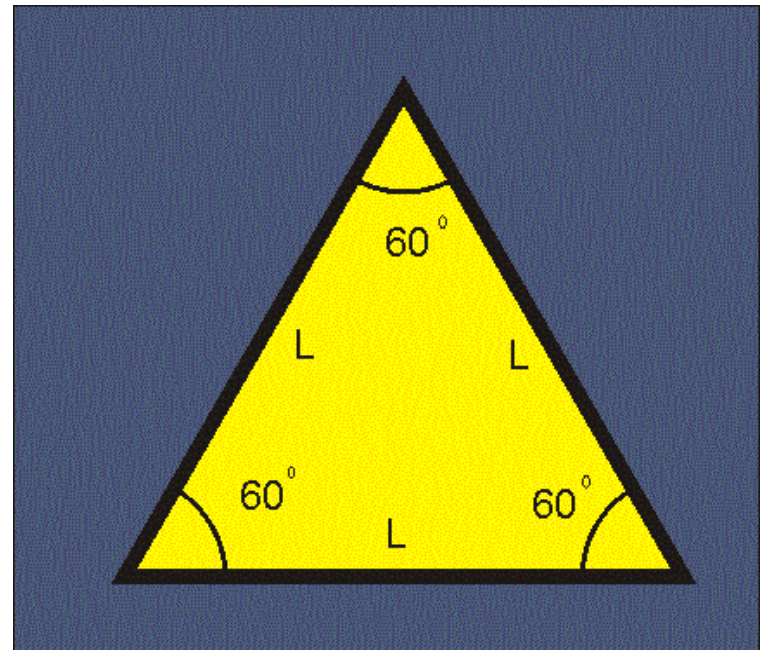
CLASIFICACION OF POLYGONS BY THE NUMBER OF SIDES

TRIANGLES

- The sum of the angles of a triangle is 180 degrees.

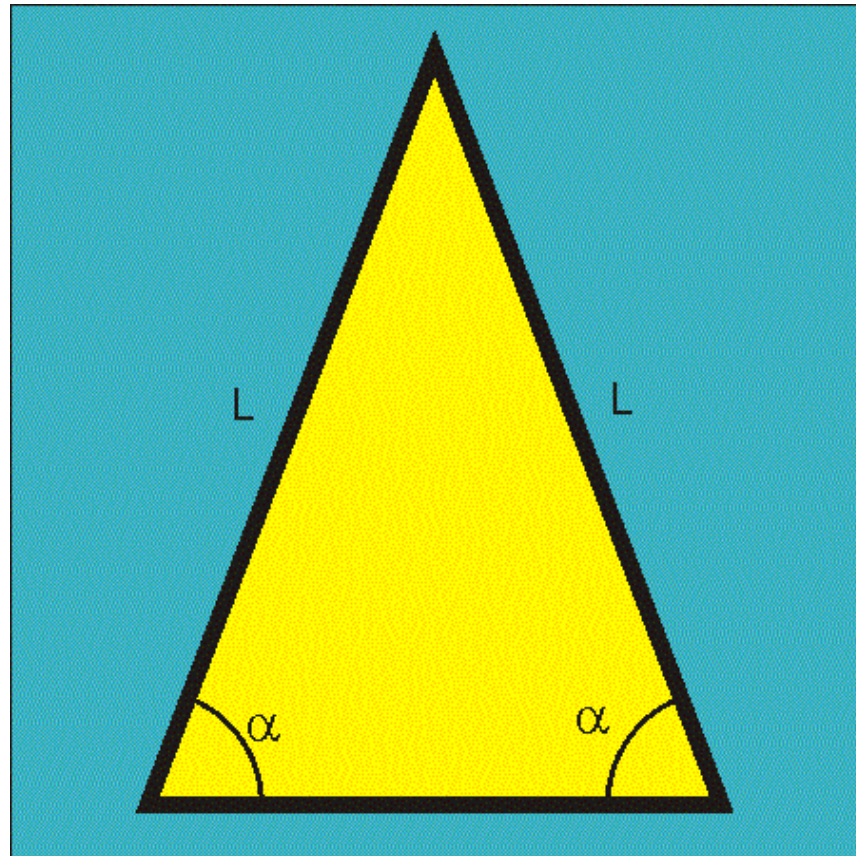
Equilateral Triangle

An equilateral triangle has three sides of equal length. This means that each angle is 60 degrees



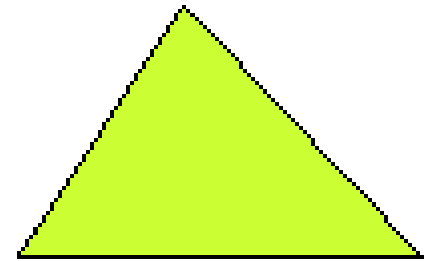
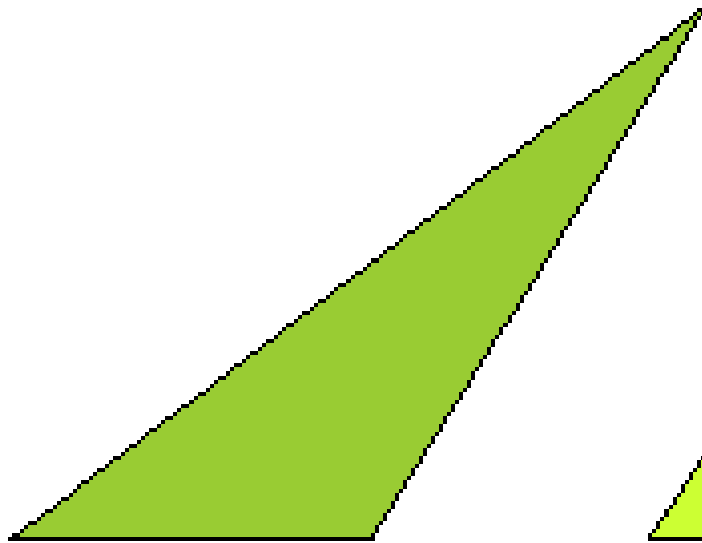
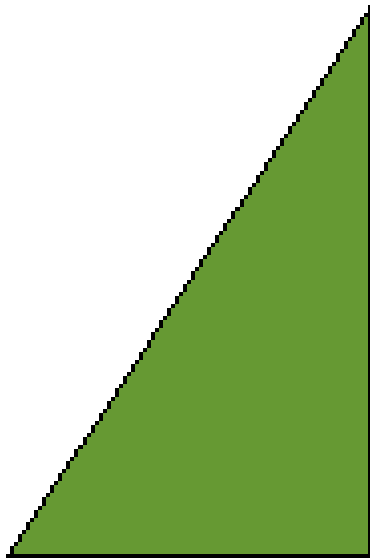
Isosceles Triangle

- ⊙ A triangle that has two sides of equal length. Therefore, it has two equal angles.



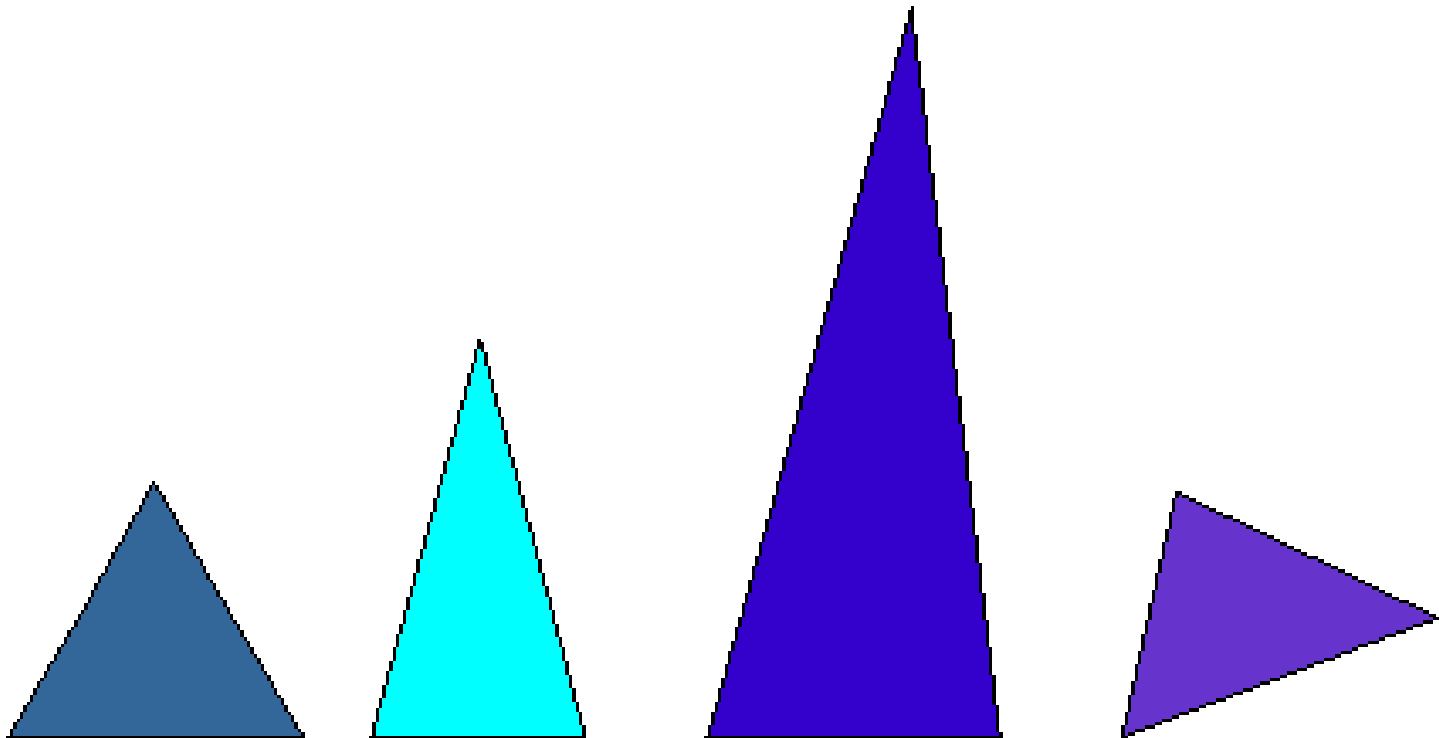
Scalene Triangle

- A scalene triangle has three sides with different lengths. Therefore, it has three different angles.

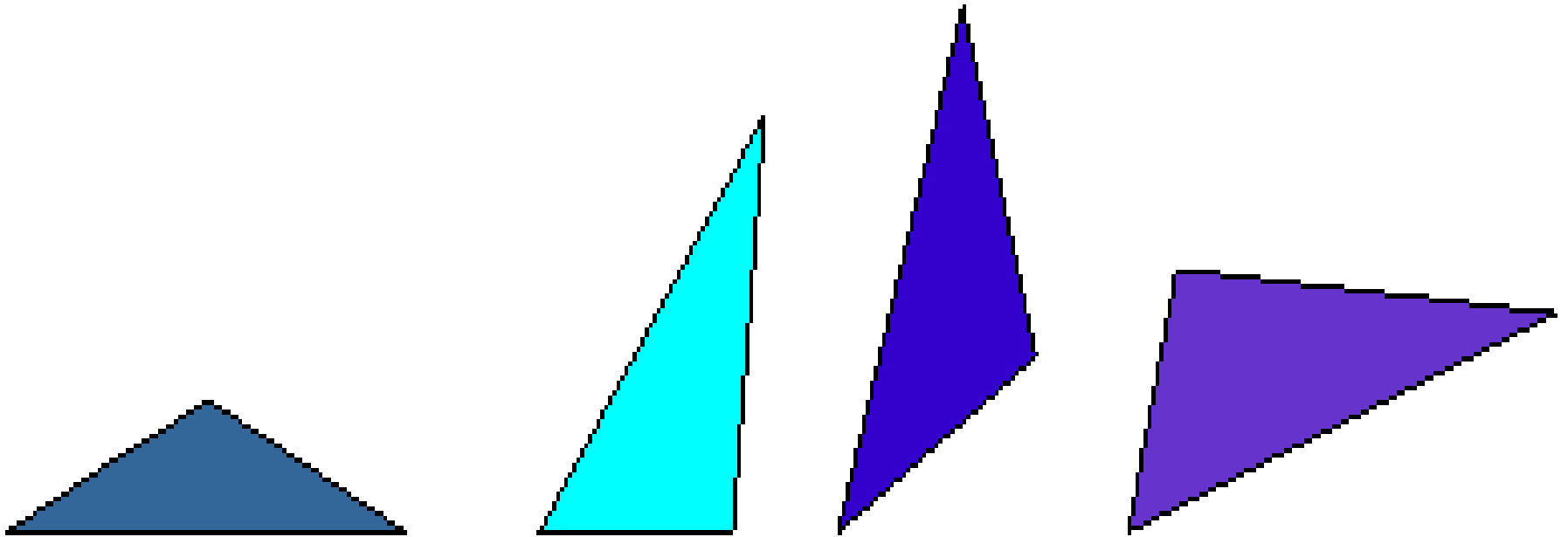


CLASIFICATION OF THE TRIANGLES BY THEIR ANGLES

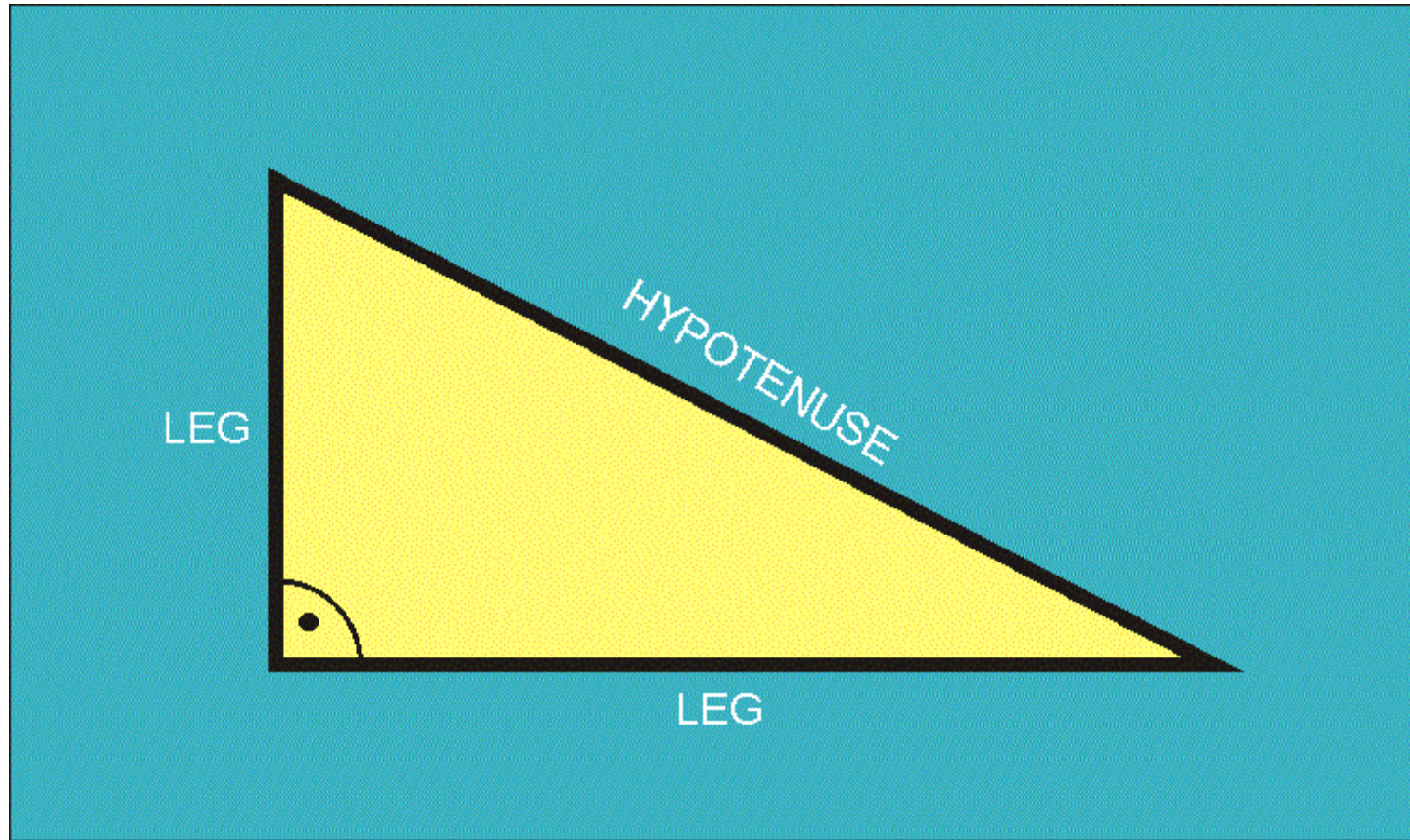
Acute Triangle : An acute triangle has three acute angles.



Obtuse Triangle: An obtuse triangle has an obtuse angle, in which one of the angles is more than 90 degrees.

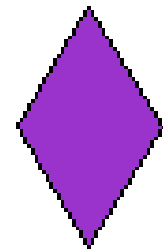
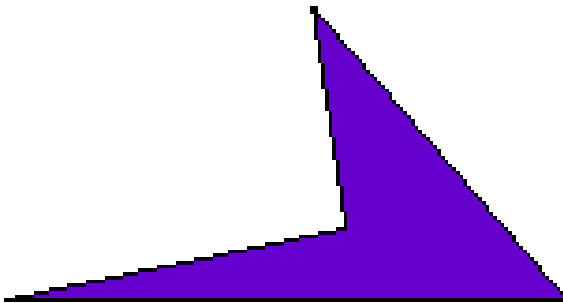
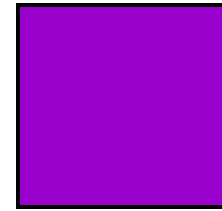
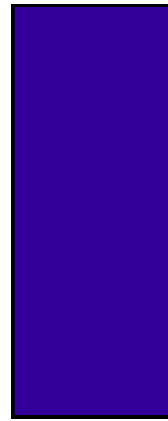


Right Triangle : A right triangle has a right angle, in which one of the angles is 90 degrees.



Quadrilateral

- A quadrilateral is a four-sided polygon in which the sum of all the angles is 360°



CLASIFICACION



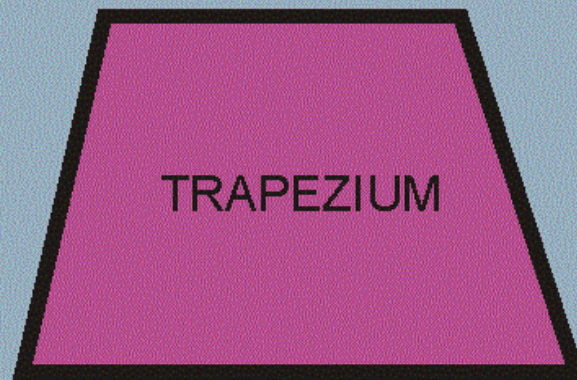
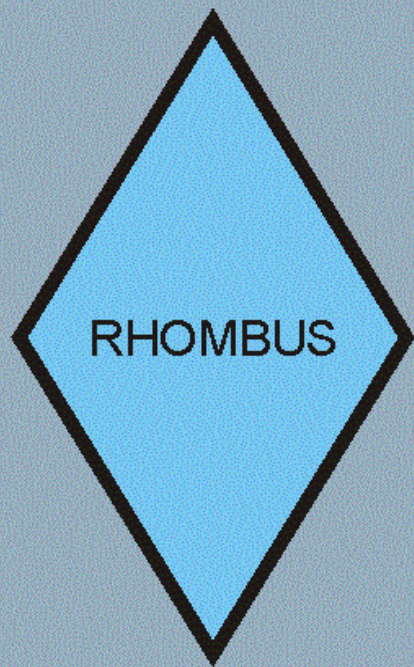
RECTANGLE

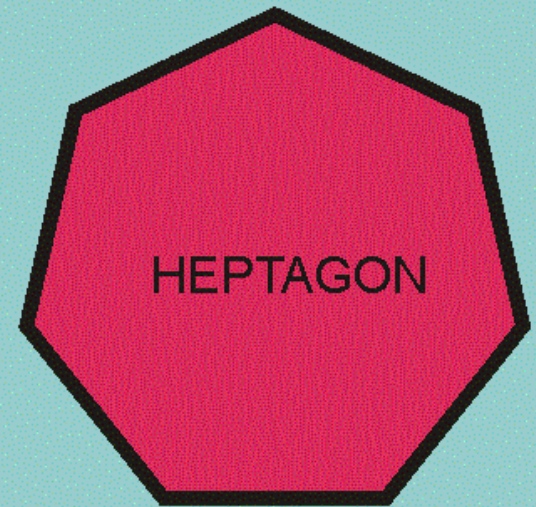


SQUARE



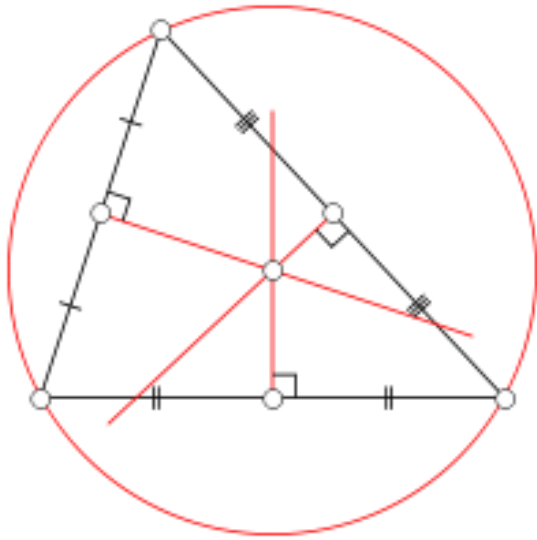
ROMBOID



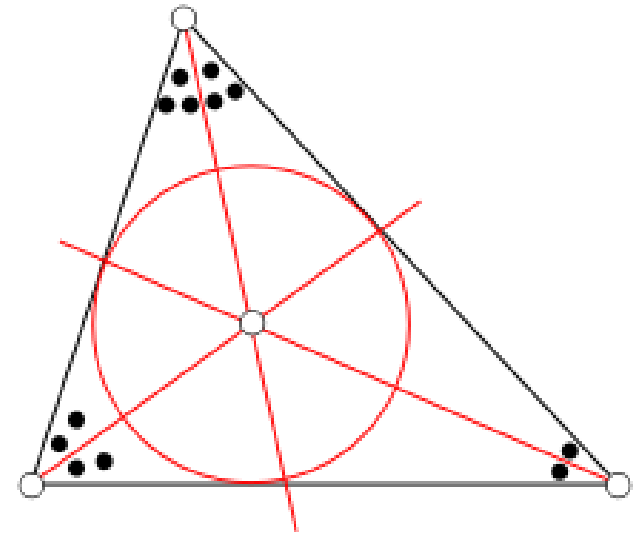


<http://www.youtube.com/watch?v=69lfTURDles> (the song of polygons)

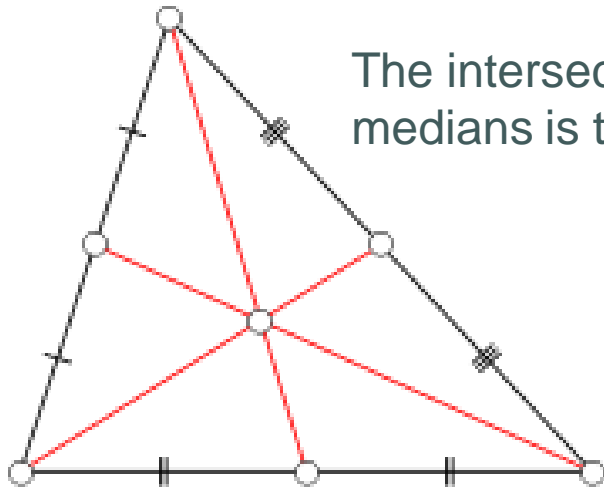
POINT, LINES AND CIRCLES ASSOCIATED WITH A TRIANGLE



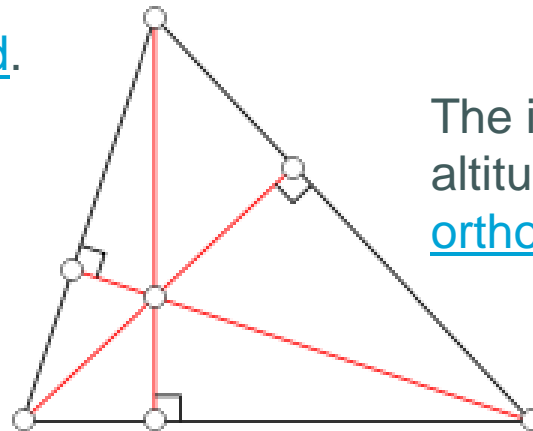
The [circumcenter](#) is the center of a circle passing through the three vertices of the triangle.



The intersection of the angle bisectors is the center of the [incircle](#).



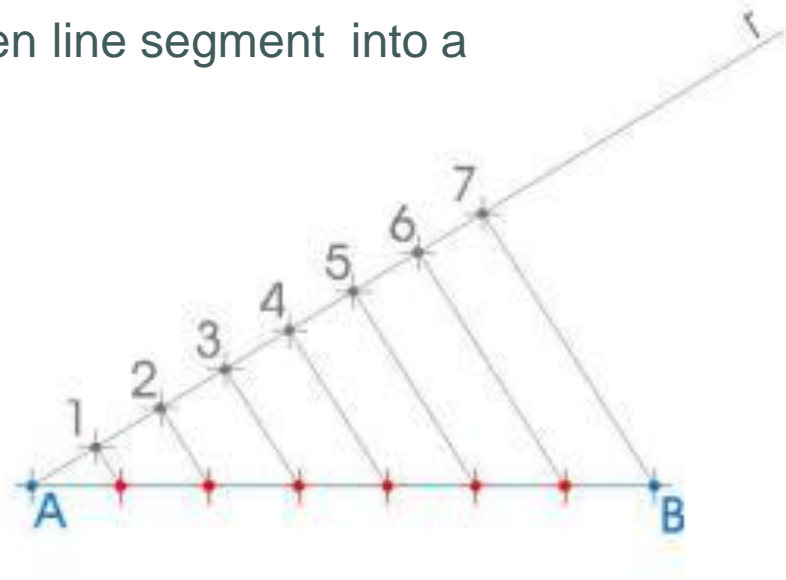
The intersection of the medians is the [centroid](#).



The intersection of the altitudes is the [orthocenter](#).

Remember: THALES THEOREM

We use Thales Theorem to divide a given line segment into a number of equal parts



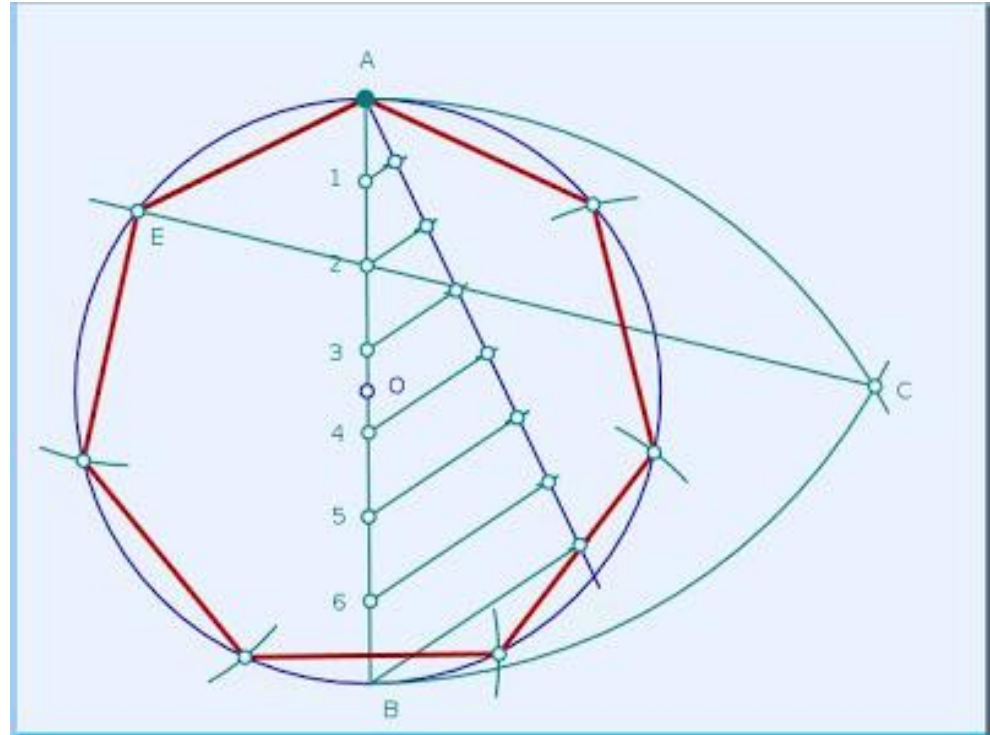
Using Thales we can divide a segment in equal parts.

STEPS:

1. Draw the given segment AB. This is the segment that we want to divide.
2. From point A draw an oblique ray (r).
3. Chose a measure with your compass and from point A draw arcs on the oblique ray as many arcs as parts you need.
4. Join the last point of the oblique ray with point B.
5. Draw parallels using your set square to the segment B7 from the other points on the ray.

HOW TO CONSTRUCT A “n” SIDED REGULAR POLYGON

- 1- Draw a circumference and its diameter AB. Divide the diameter in as many parts as sides has the polygon (Thales Theorem).
- 2- With center at points A and B and radius the diameter's length, draw both arcs which intersect at point C.
- 3- Join point C with the **second** division on the diameter, and extend it so that it cuts the circumference at point E.
4. The segment AE is the side of the required polygon.



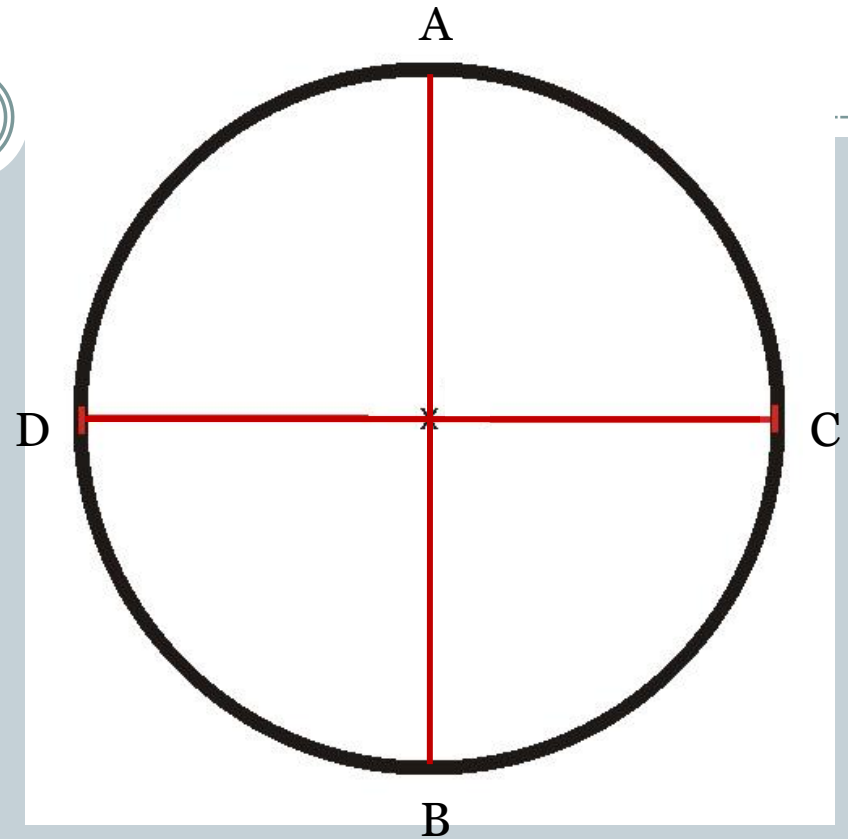
http://www.educacionplastica.net/zirkel/divCir_sol.html

Check the following link to see more ways to construct regular polygons:

<http://www.educacionplastica.net/poligonos.htm#pri>

STAR POLYGONS

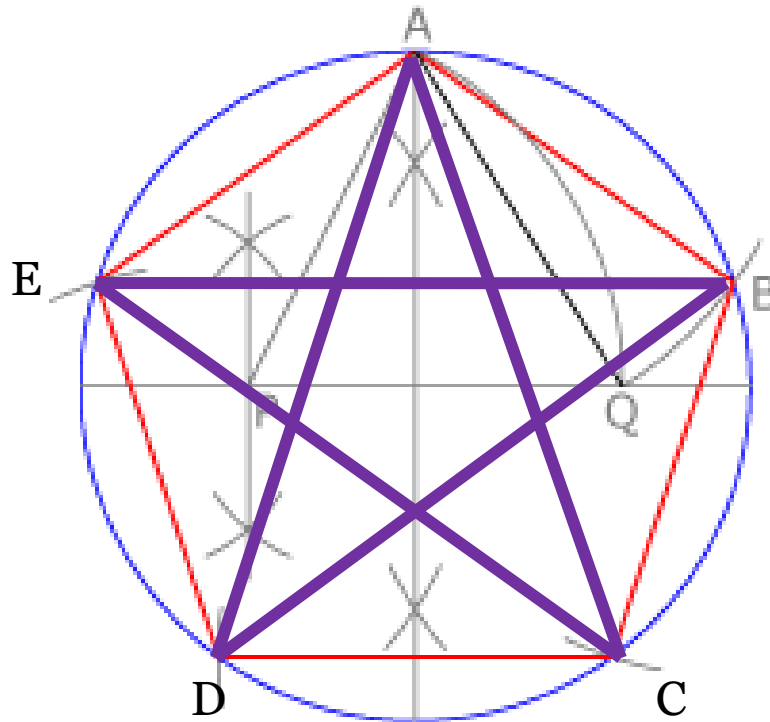
- A star-shaped polygon is formed by joining together the non-consecutive vertices in a regular polygon.
- To construct a star polygon inscribed in a circumference, we need to follow the same steps to draw a regular polygon, it depends on how many points of a star we want to draw.
- So we must start finding the star points as they were the polygon vertices.



FIVE STAR POLYGON



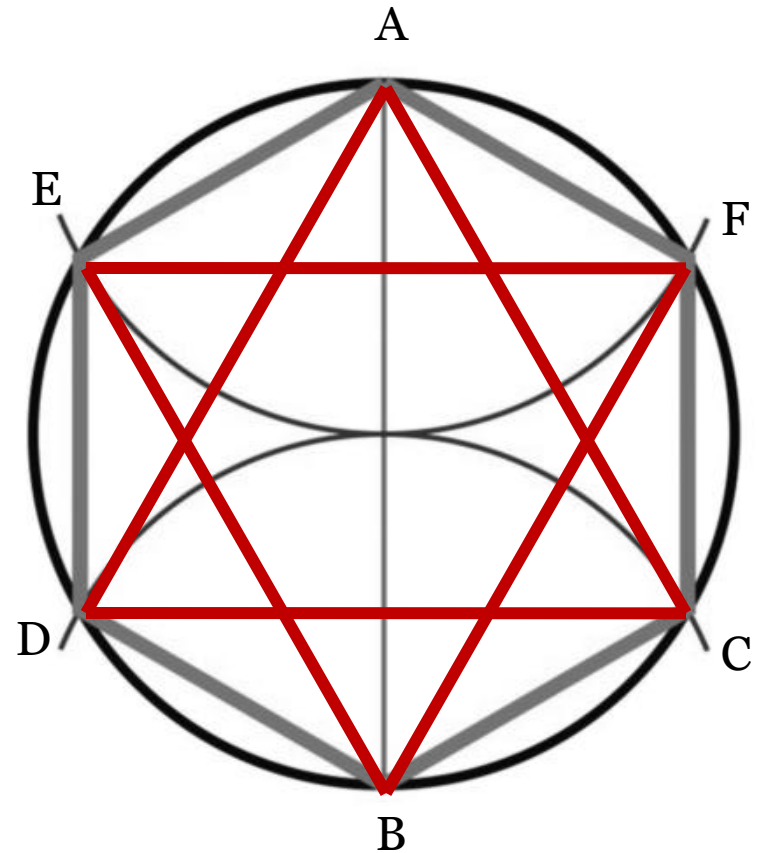
- Follow the same steps you follow to draw a pentagon.
- You have now points A, B, C, D and E.
- Join the non-consecutive vertices as follows: A-D, E-C, D-B, C-A and B-E



SIX POINTS STAR POLYGON



- Follow the same steps you follow to draw an hexagon.
- You have now points A,F,C B,D and E.
- Join the non-consecutive vertices as follows: A-C, C-D,D-A,E-F,F-B and B-E



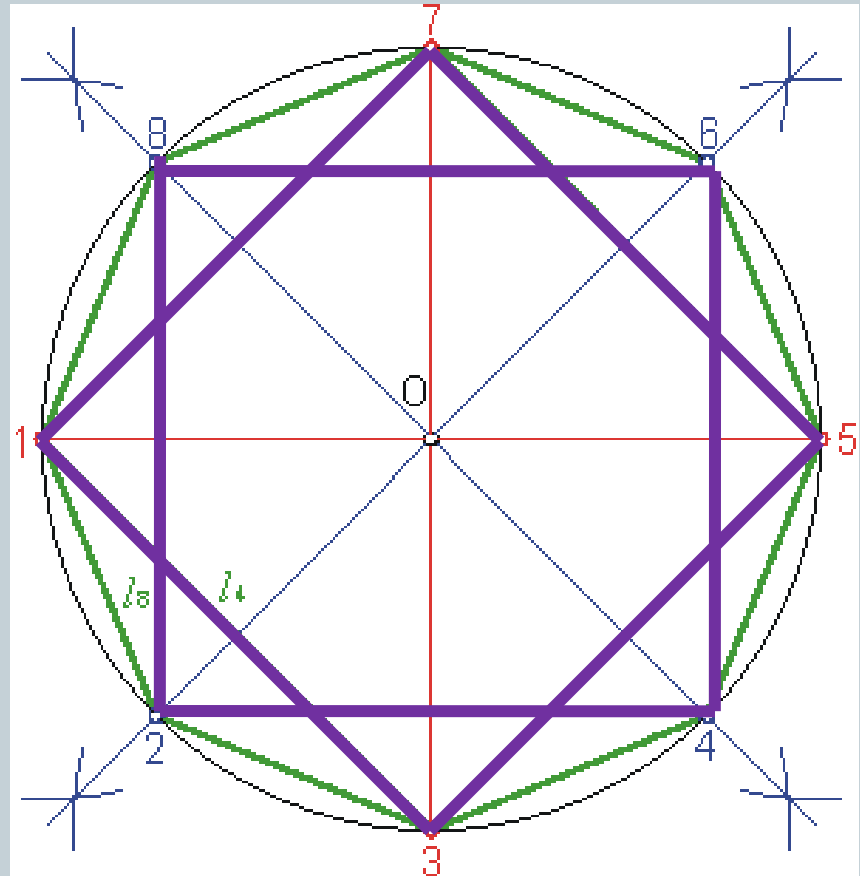
EIGHT POINTS STAR POLYGON



- After the first steps common to all regular polygons we get four right angles and points A, B, C, D.

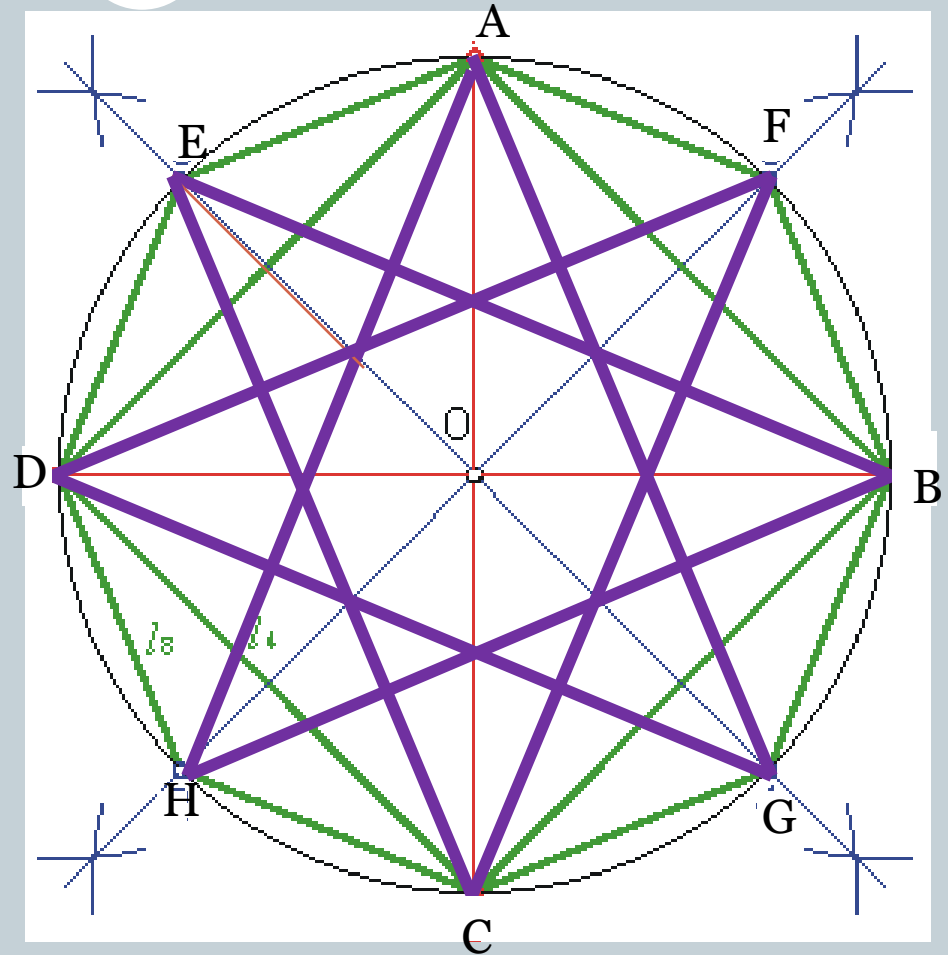
- Find the angle bisector of each angle. Those lines intersect the circumference at points E, F, G and H.

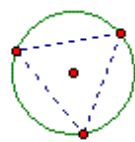
- Join together the non-consecutive vertices to find an eight points star polygon:
A-B, B-C, C-D, D-A
and E-F, F-G, G-H, H-E



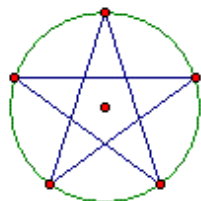
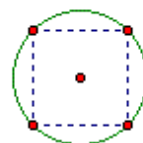
LONG EIGHT POINTS STAR POLYGON

- Follow the same steps you follow to draw an eight points star polygon.
- We'll name these points with numbers this time, to make easier the joining.
- Join the 1+3 non-consecutive points beginning at number 1.

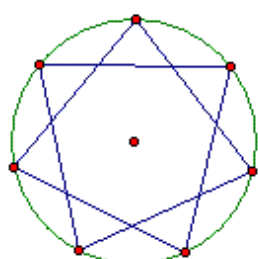
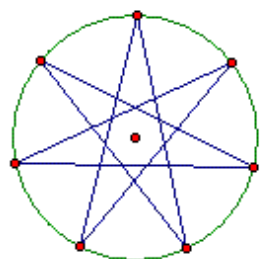
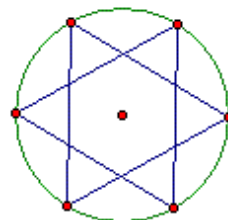




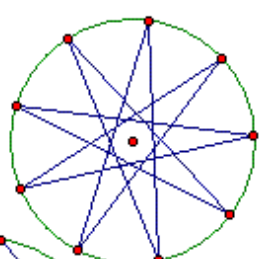
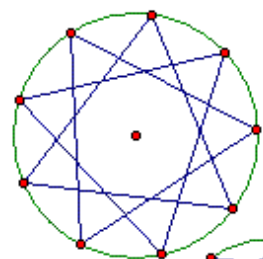
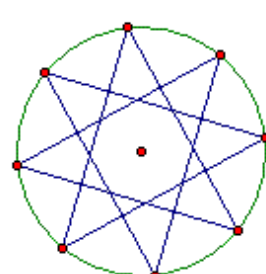
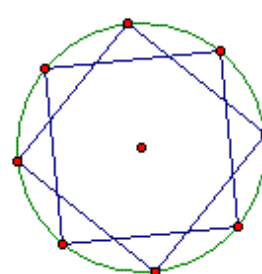
Triangle and square: no star polygons



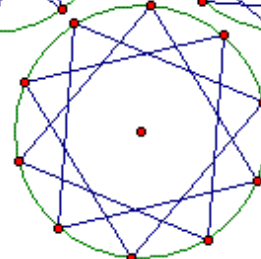
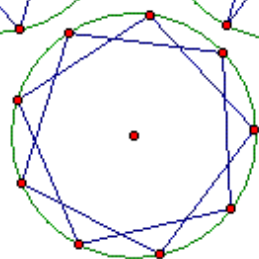
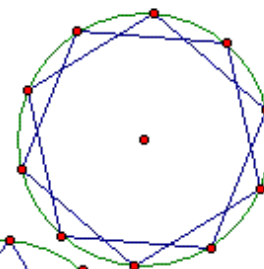
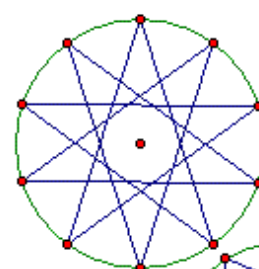
Pentagon and hexagon:
one star polygon, each



Heptagon and octagon:
two star polygons, each



Nonagon and decagon:
three star polygons, each



Binary Filling of Star Polygons

