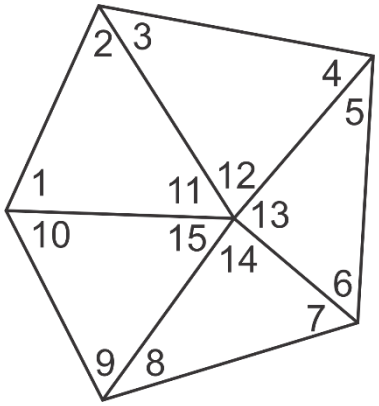
Math 4 d. Class work 25.

Tessellation.

The sum of the angles of a polygon. Any polygon can be divided into set of triangles, with the vertices in the vertices of the polygon and an arbitrary point inside the polygon as on the picture.



The sum of all angles:

$$\angle 1 + \angle 2 + \angle 3 + \angle 4 + \angle 5 + \angle 6 + \angle 7 + \angle 8 + \angle 9 + \angle 10 + \angle 11 + \angle 12 + \angle 13 + \angle 14 + \angle 15 = 5 \cdot 180$$

because we have 5 triangles and the sum of the angles of a triangle is 180°. But

$$+\angle 11 + \angle 12 + \angle 13 + \angle 14 + \angle 15 = 360^\circ$$

$$\angle 1 + \angle 2 + \angle 3 + \angle 4 + \angle 5 + \angle 6 + \angle 7 + \angle 8 + \angle 9 + \angle 10 + 360^\circ = 5 \cdot 180$$

$$\angle 1 + \angle 2 + \angle 3 + \angle 4 + \angle 5 + \angle 6 + \angle 7 + \angle 8 + \angle 9 + \angle 10 = 5 \cdot 180^\circ - 360^\circ = (5-2) \cdot 180$$

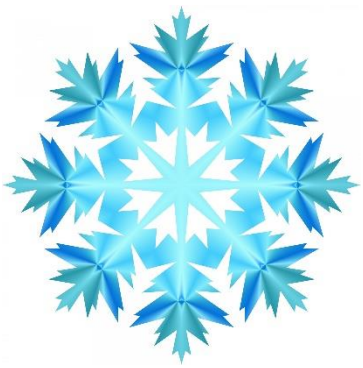
Or for arbitrary convex polygon the sum of all internal angles is

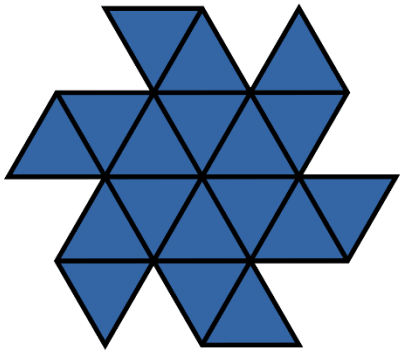
$$(n-2) \cdot 180$$

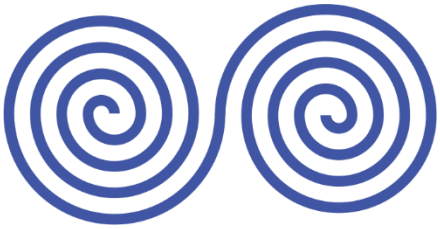
n is number of sides. Based on this we can calculate the angle of a regular polygon

$$\frac{(n-2) \cdot 180}{n}$$

Pentagon	180
Hexagon	120
7 side	128.6
8 side	135







- An object has reflectional symmetry (line or mirror symmetry) if there is a line (or in 3D a plane) going through it which divides it into two pieces that are mirror images of each other.

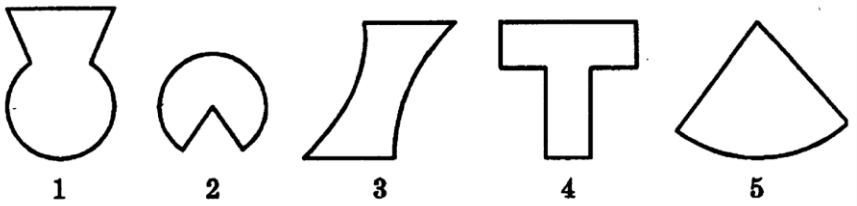
- An object has rotational symmetry if the object can be rotated about a fixed point (or in 3D about a line) without changing the overall shape.

- An object has translational symmetry if it can be translated (moving every point of the object by the same distance) without changing its overall shape.

- Glide reflection symmetry: a reflection followed by a translation.

1. Which of the shapes is most symmetrical? Draw all lines of symmetry.

2. Which shape does not belong to the set of shapes:



3. Does the shape below has a symmetry?

4. Find symmetry for all letters.