

Lesson 2

Simplest geometrical shapes: segment, ray, triangle, circle.

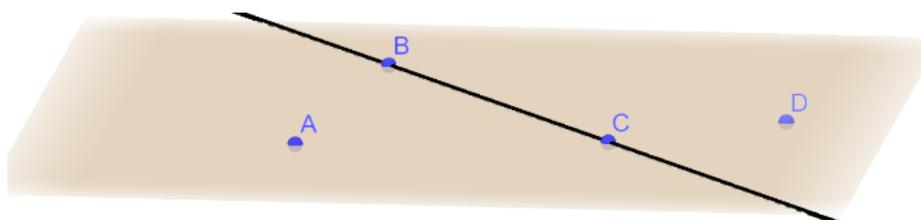
Draw a point on a sheet of paper.

- *How many straight lines can you draw through this single point?*

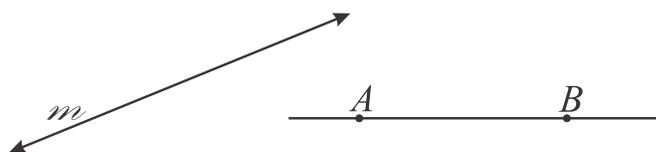
Draw another point.

- *How many straight lines can you draw through these two points?*

Through two points we always can draw a line (straight) and we can draw only one line. If the line is drawn on plane, a point can be marked on this plane. This point can either lie on a line or not.



Draw a line and mark two points on the line. The part of the line between two points is a segment ($[AB]$).



Draw a line. Mark one point on it, point A. This point produces two rays.



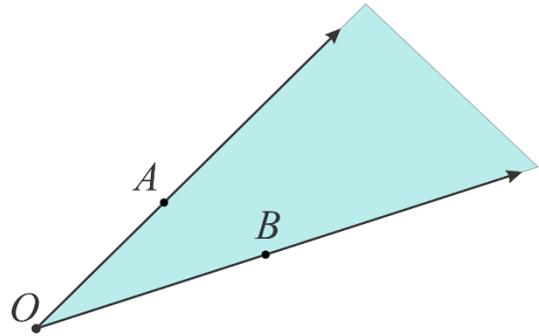
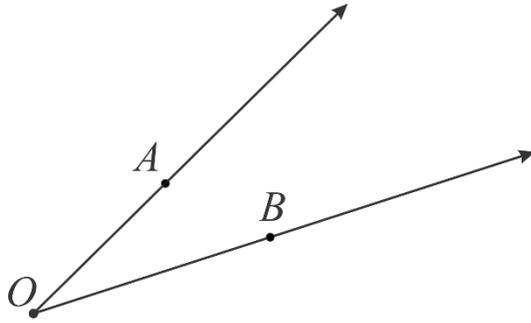
Part of a straight line on one side of a chosen point is a ray (\overrightarrow{AB}).



If we draw two rays from the same endpoint, we will get an angle.

- *Into how many parts does an angle divide a plane?*

We can consider an angle to be two rays or two rays and the part of the plane they limit together. The difference only important when we look for the intersection of an angle and another geometrical figure.



Exercises:

1. Draw two segments so their intersection is
 - a. A point
 - b. A segment
 - c. No intersection
2. Draw two rays so that their intersection is
 - a. A point
 - b. A segment
 - c. A ray.
3. Let consider an angle as part of the lane along with two rays. Draw two angles so that their intersection with a line will be
 - a. A segment
 - b. A point
 - c. A ray
 - d. No intersection

What would be the difference, if we will think about an angle as only two rays coming from the same endpoint?

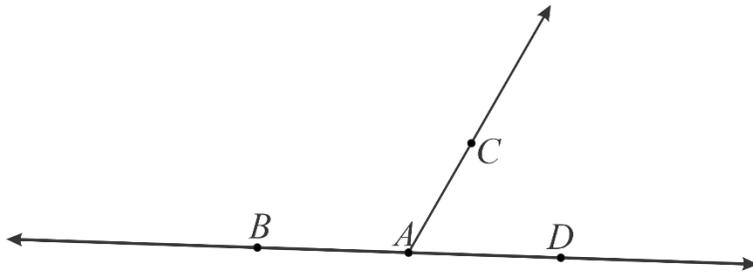
Angles notations are usually three capital letters with vertex letter in the middle or small Greek letter: $\angle ABC$, α .

If a point marked on a line, it produces two rays with the common vertex, an angle. This



angle has it's own name: a straight angle.

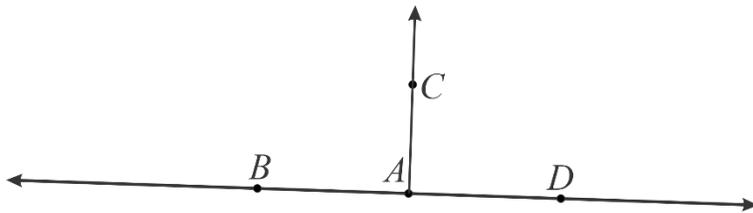
If another ray is coming from the vertex of a straight angle, we now have three angles, $\angle CAB$, $\angle CAD$, $\angle BAD$.



- *What can you say about these angles?*

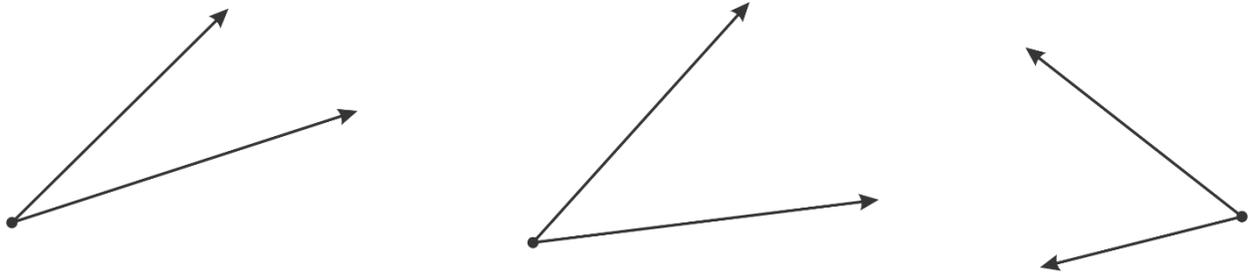
Such angles we call supplementary angles.

There is only one angle which supplement itself to a straight angle. In this case supplementary angles are equal, and we call this angle a right angle. Measure of the straight angle is 180° , measure of the right angle is 90°



Measuring angles.

4. Measure angles:

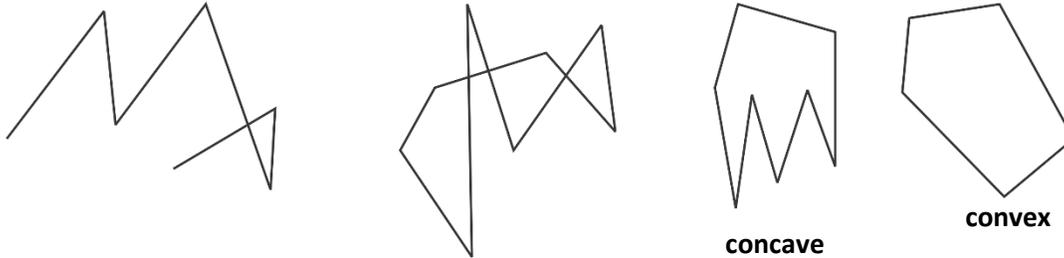


5. Using the protractor draw angles 20° , 30° , 60° so, that they all have one common side.
6. Using only the ruler, draw angles 30° , 45° , 80° , 90° , 120° . Measure them with protractor.
7. Draw a quadrilateral which has three right angles. What would be the fourth angle?
8. Draw a square. Draw the diagonals in this square. Which angle the diagonal forms? Why do you think so?
9. If you look at a 10-degree angle through a magnifying glass, what would be the measure of the angle you see?

Polygons.

Draw a chain of segments, so that the last point of one segment is a first point of the next, and two consecutive points don't lie on the same line.

Draw such chain so that the last point of the last segment is the first point of the first one. We got a closed broken line. Is this a sufficient condition to get a polygon?



- *What is the difference between convex and concave polygons?*

The simplest polygon is a triangle.

Draw a triangle. Measure its angles. Add them. How much did you get?

10. Draw the isosceles

- right triangle
- acute triangle
- obtuse triangle

11. Can you draw inside an isosceles triangle another isosceles triangle with the same sides? With bigger sides?

12. Draw a triangle with sides 3 cm, 5 cm and the angle between them 50° .

13. Draw a triangle with angles 30° and 50° and the side between them 7 cm. Do we need another information?

14. Vertical angles (angles formed by two intersecting lines) are equal. Why?

15. Into how many parts three rays can divide a plane?

16. Into how many parts two angles can divide a plane?

17. Copy the picture, use compass:

