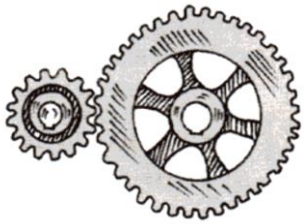
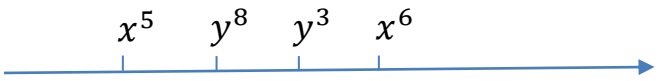
Class work 6. Algebra.

Algebra.

1. Two gears are in in clutch. One gear has 18 cogs, and another has 63. How many turns will each gear make before they both return to their original position?



2. $x^5 < y^8 < y^3 < x^6$
   Where 0 should be placed?



3. Simplify the following fractions:

$\frac{5^3 \cdot 2^7}{5^2 2^6}$;

$\frac{(3 \cdot 5)^5 \cdot 7^{10}}{3^2 \cdot 5^3 \cdot 7^7}$;

$\frac{a^3 \cdot b^7}{a^2 b^6}$;

$\frac{(a \cdot b)^5 \cdot x^{10}}{a^2 \cdot b^3 \cdot x^7}$;

4. Simplify the following expressions for valid variable values (it means that we are not dividing by 0 anywhere).

a. $\left(\frac{1}{a^3}\right)^2 \cdot (-3aa^4)$;

b. $(-2b^3)^5 \cdot \left(-\frac{1}{2b^3}\right)^3$

c. $\frac{-3x^2 \cdot (-xy)^3 \cdot x^0 \cdot y^0}{(x^2)^3 \cdot (-3y)^2}$

d. $\frac{(m^2n)^3 \cdot (mn^4) \cdot (-25m)^2}{(-5m^3n^2)^3 \cdot (mn)^0}$

5. Evaluate, use the properties of the exponent

$$\left(\frac{2^{12} \cdot 2^{28} \cdot 2^{35} \cdot \left(\frac{1}{2}\right)^{74} \cdot 10^{25}(3^3)^8}{(2 \cdot 3)^{24} \cdot (5^{42} : 5^{16})}\right)^2 =$$

6. What should be placed instead of n for the equalities to hold?

$a.\quad x^n \cdot x^6 = x^{18}$; $b.\quad (x^n)^x \cdot x^6 = x^{18}$

$c.\quad (y^{10})^n = y^{40}$; $d.\quad y^{10} \cdot y^n = y^{40}$

7. Represent a^{24} as an exponent with the base

   $a.\ a^2$; $b.\ a^3$; $c.\ a^4$; $d.\ a^6$; $e.\ a^8$; $f.\ a^{12}$

8. Compare the following exponents:

   $a.\ 2^{10}\ and\ 10^3$; $b.\ 10^{100}\ and\ 100^{10}$

   $c.\ 2^{300}\ and\ 200$; $d.\ 31^{16}\ and\ 17^{20}$; $e.\ 4^{53}\ and\ 15^{45}$

9. Prove that

   $8^5 + 2^{11}$ is divisible by 17

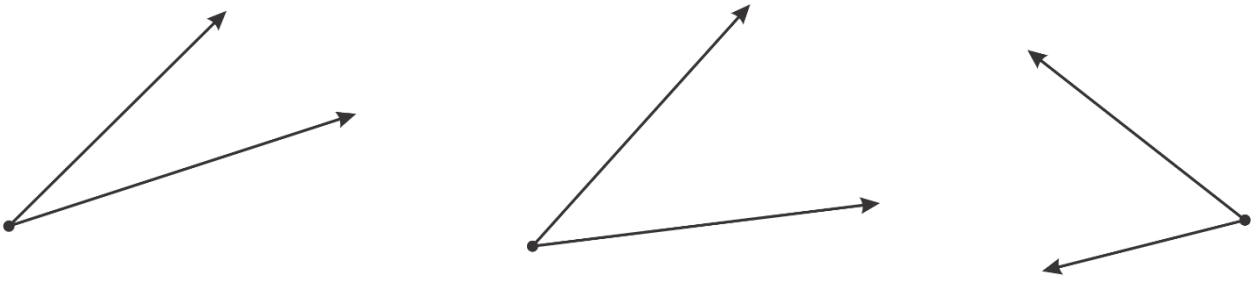
   $9^7 - 3^{10}$ is divisible by 20

10. Jane and Mary are doing fall clean up in a backyard. Mary can do the job in 6 hours; together they can do it in 4 hours. How many hours does Jane need to clean up the backyard?

11. 5 hamsters will eat 5 bags of hamster food in 5 days. How many days 10 hamsters need to eat 10 bags of food?

12. A farmer has a cow, a goat and a goose. The cow and the goat will eat all the grass on his meadow in 45 days, the cow and the goose will eat all the grass on the same meadow in 60 days, and the goat and the goose will eat all the grass on the meadow in 90 days. How many days will it take them altogether to eat all the grass on the meadow? (we assume that the new grass is not growing.)

1. Measure angles:



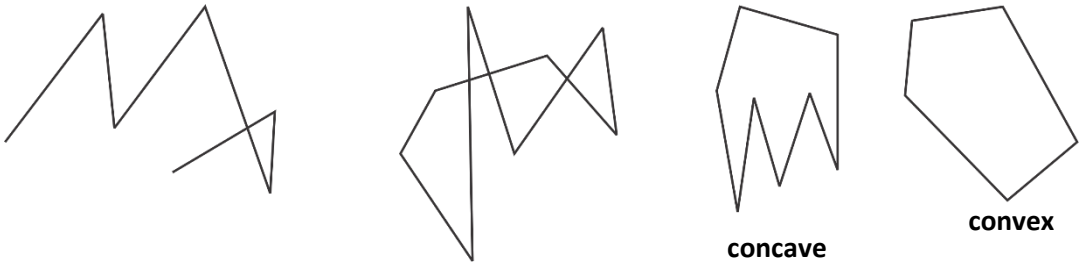
2. Using the protractor draw angles 20°, 30°, 60° so, that they all have one common side.
3. Using only the ruler, draw angles 30°, 45°, 80°, 90°, 120°. Measure them with protractor.

4. Draw a quadrilateral which has three right angles. What would be the fourth angle?
5. Draw a square. Draw the diagonals in this square. Which angle the diagonal forms? Why do you think so?
6. 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?



In geometry, a **polygon** is a plane figure that is bounded by a finite chain of straight line segments closing in a loop to form a closed chain. These segments are called its *edges* or *sides*, and the points where two edges meet are the polygon's *vertices* (singular: vertex) or *corners*. The interior of the polygon is sometimes called its *body*. An ***n*-gon** is a polygon with *n* sides; for example, a triangle is a 3-gon.

- *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?

7. Draw the isosceles
   a. right triangle
   b. acute triangle
   c. obtuse triangle

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

9. Draw a triangle with angles 30° and 50° and the side between them 7 cm. Do we need another information to construct a triangle ?
   What is a circle? Draw a cercle (use compass)