Math 4a. Classwork 25.

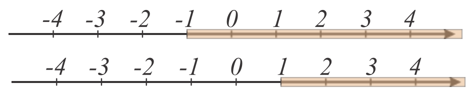
Algebra.

1. Equalities: equations and identities

Inequalities.

We can add any number to both part of the inequality, the sign (< or >) will not change:

$x > -1$



$x + 2 > -1 + 2 \Rightarrow x + 2 > 1$

$y - 3 < 5$

$y - 3 + 3 < 5 + 3$

$y < 8, \qquad y \in (-\infty, 8)$

1. $x + 3 > -5$

Now let's try to multiply or divide both part of the inequality by the positive number.

If $x > 3$, then $2x$ will be grater then 6.

$x > 3\,, \qquad 2x > 6$

If $x > 3$ what can we tell about $-x$?

$-x \qquad 3 \cdot (-1)$

2. $x + 3 > 5x - 5$
3. $4\mathrm{x} - 3 \neq 0$

4. $3(x - 1) < 5x + 9$

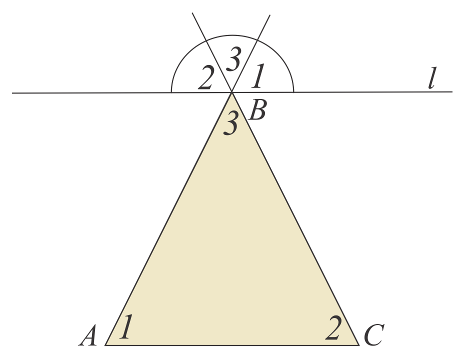
5. $2x - 1 > - x + 3$
6. $|x| > 8$

Geometry.

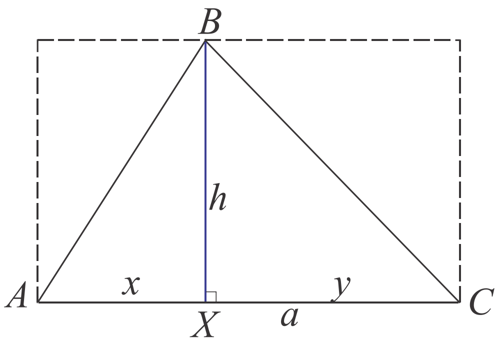
The line segment from a vertex of the triangle to the line containing the other two vertices and perpendicular to that line is called the altitude (the height). The length of this segment is also called the height of a triangle relative to its base.

Three angles of any triangle sum to a straight angle.

Line *l* is parallel to line AC. Angles (3) are equal as vertical angles, angles (2) are equal and angles (1) are equal because line *l* is parallel to line AC.



Area of the triangle.



$S_{\Delta} = \frac{1}{2} h \times a$

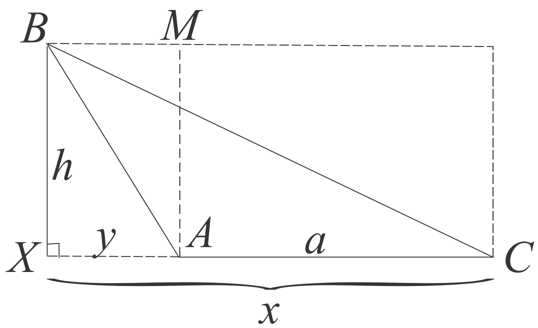
The area of a triangle is equal to half of the product of its height and the base, corresponding to this height.

For the acute triangle it is easy to see.

$$S_{\square} = h \times a = x \times h + y \times h$$

$$S_{\Delta ABX} = \frac{1}{2} h \times x, \qquad S_{\Delta XBC} = \frac{1}{2} h \times y, \qquad S_{\Delta ABC} = S_{\Delta ABX} + S_{\Delta XBC}$$

$$S_{\Delta ABC} = \frac{1}{2} h \times x + \frac{1}{2} h \times y = \frac{1}{2} h(x + y) = \frac{1}{2} h \times a$$



For an obtuse triangle, for one out of the three heights, it is not so obvious.

$$S_{\Delta XBC} = \frac{1}{2}h \times x, \qquad S_{\Delta XBA} = \frac{1}{2}h \times y$$

$$S_{\Delta ABC} = S_{\Delta XBC} - S_{\Delta XBA} = \frac{1}{2}h \times x - \frac{1}{2}h \times y$$
$$= \frac{1}{2}h \times (x - y) = \frac{1}{2}h \times a$$