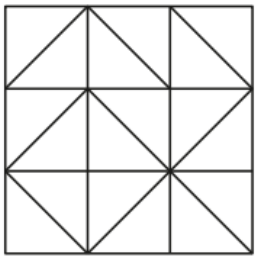
Math 6c, homework 9

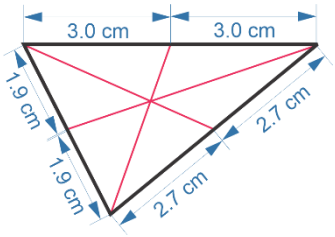
1. A square is divided into triangles (see the figure). How many ways are there to color exactly one third of the square? (The small triangles cannot be colored partially.)

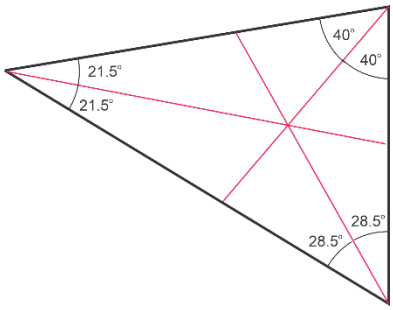


2. Draw three triangles, in the first triangle, draw three medians, in the second triangle draw three bisectors, in the third triangle, draw three altitudes.

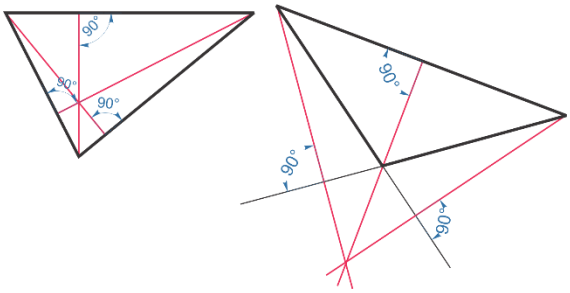
Examples:

A **median** of a triangle is a segment drawn from a **vertex** to the **midpoint of the opposite side**.



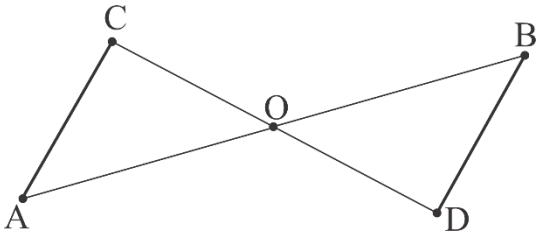


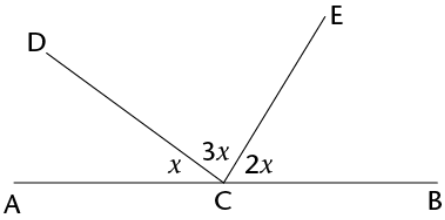
An **angle bisector** is a ray (segment in a triangle) that **divides an angle into two equal angles**.



An **altitude** of a triangle is a segment drawn from a **vertex perpendicular** to the opposite side (or its extension).

3. Segments AB and CD intersect at point O, which is the midpoint of each of them. What is the length of segment BD if segment AC = 10 m?





4. Calculate the measure of angle x from the picture below (points A, C and B lie on the same line)

5. Calculate the value of the expression:

$$a.\ \frac{80!}{79!}+\frac{59!}{58!};\qquad b.\frac{2025!-2024!}{2023!}\ ;$$

Hint: $n!=n\cdot(n-1)!=n\cdot(n-1)\cdot(n-2)!\ and\ so\ on.$

6. Show, that
   a. $(m-n)(m^2+mn+n^2)=m^3-n^3$
   b. $(m+n)(m^2-mn+n^2)=m^3-n^3$