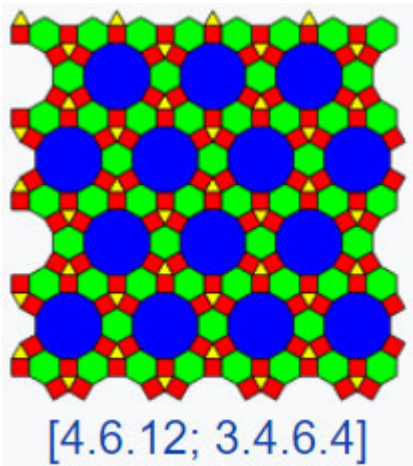


List of question types for a quiz Thursday March 5<sup>th</sup> in Math 412 (Topics in Geometry)

1. Given an n-uniform tessellation (like the one below), give the name of the tessellation using the vertex notation shown here:



For more information see:

[https://en.wikipedia.org/wiki/Euclidean\\_tilings\\_by\\_convex\\_regular\\_polygons#k-uniform\\_tilings](https://en.wikipedia.org/wiki/Euclidean_tilings_by_convex_regular_polygons#k-uniform_tilings)

And

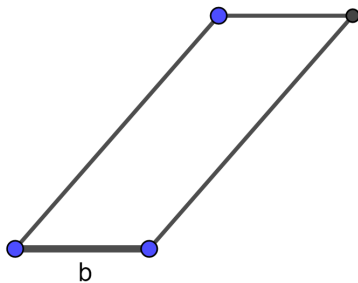
<https://www.mathsisfun.com/geometry/tessellation.html>

2. Draw a dual of a tessellation

See here for more information:

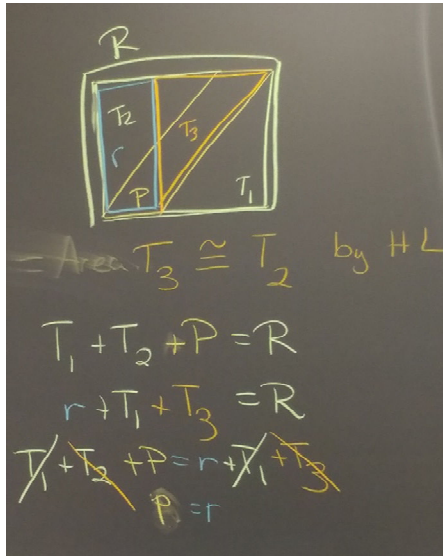
<https://mathworld.wolfram.com/DualTessellation.html>

3. If I give you a parallelogram with a particular base identified, like this:

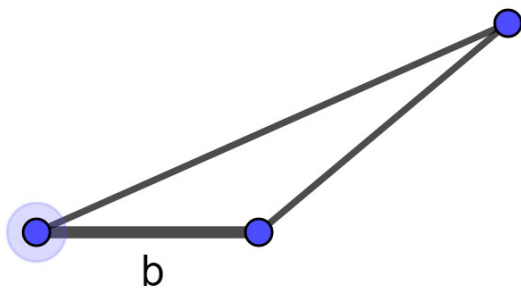


Show/explain why it has the same area as a rectangle with the same base and height. It's OK to do this by:

Cutting and sliding over **or** shearing using Riemann sum pictures/ideas **or** the picture I shared in class last week:



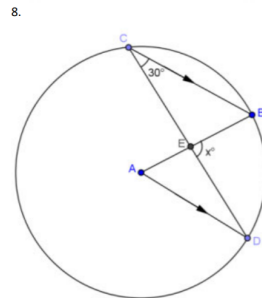
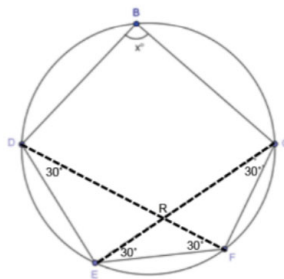
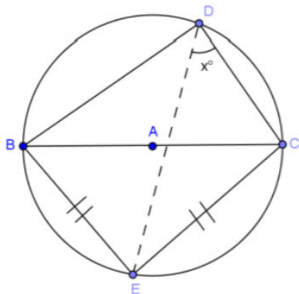
4. If I give you a particular triangle with a particular base, explain why its area is  $(1/2)$  base  $\times$  height:



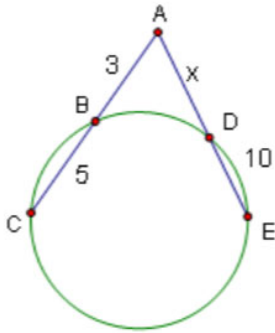
By showing it is half of a parallelogram with the same base and height **or** by enclosing it in a rectangle with the same height, and using the area formulas for the area of the rectangle and the areas of right triangles **or** by drawing and explaining using Riemann sums to explain the shearing property of area.

5. Inscribed angle problem(s) similar to one of these:

1. Hint: Thales' theorem

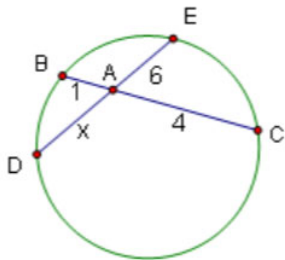


6. Power of a point theorem problem(s) similar to one of these:



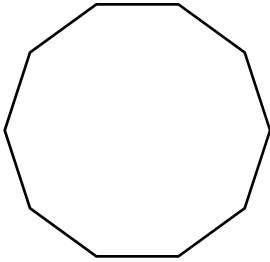
Solution: using the power of a point formula, we know:  $3 \cdot (3 + 5) = x(x + 10)$

Then solve for x



Solution: using the power of a point formula, we know:  $1 \cdot 4 = x \cdot 6$  (then solve for x)

7. Given a regular polygon, such as this decagon:



Draw in additional triangles and/or exterior angles to explain what the sum of the interior angles is and why, and also find the measure of a single angle.

8. Given a construction of a rectangle that uses perpendicular and parallel lines, explain why the resulting construction is really a rectangle (really has all 4 right angles). You are most likely to need the parallel lines (theorems 6-8.5) and the angle sum of a quadrilateral to do this.