1. Find the distance from the point (1, 2) to the line $3x + 4y - 1 = 0$.

2. Given a rational cubic Bézier curve $P_{[0,1]}(t)$ whose control points have the following Cartesian coordinates and weights:

   $P_0 = (0, 0), \ w_0 = 1; \ P_1 = (3, 4), \ w_1 = 2; \ P_2 = (10, 5), \ w_2 = 4; \ P_3 = (10, 0), \ w_3 = 1.$

   compute the curvature at $t = 0$.

3. Find the center of the osculating circle for the point $P_{[0,1]}(0)$ on the curve in Problem 2.

4. Find the area of the triangle with vertices $(1, 2), (5, 5), (6, 1)$.

5. Find the vector that is perpendicular to the triangle with vertices $(1, 1, 1), (4, 5, 1)$, and $(1, 4, 5)$.

6. Find the coordinates of the point $(6, 7, 3)$ after rotating it $90^\circ$ about the axis that goes through point $(1, 2, 3)$ with a direction vector $(1, 2, 2)$.

Hand in this homework in class on 13 September.