

Geometry II. Sample test

1. Give the equation of the line, determined by the tangent points T_1 and T_2 , drawn from $P(10, -8)$ to the ellipse $\frac{x^2}{25} + \frac{y^2}{16} = 1$.
2. Find out the type of conic represented by $17x^2 - 30xy + 17y^2 = 128$ after canonical transformation.
3. Let P be the rotated image of $Q = (1, 1, -3)$ around the line $l: 2x = 2y = z$.
 - a. What is the minimal distance of P to $S = (0, 1, 2)$?
 - b. Minimize the area of OPS_Δ .
4. Let A be the composition of the following transformations: rotation around the origin by an acute $\alpha = \tan^{-1}(2)$ and translation by vector $v = (2, 3)$. Determine the matrix form of A in homogeneous form. What is the image of the following curve: $\frac{x^2}{9} + \frac{y^2}{4} = 1$