

Analytic Geometry - Assignment #3

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Exercise 1 Let r be the straight line through $A = (1, 2, 5)$ and $B = (0, 1, 0)$. Find the coordinates of a point P on r with the length of \overrightarrow{PB} being three times the length of \overrightarrow{PA} .

Exercise 2 Prove that the locus of all points that are equidistant from $A = (1, -1, 2)$ and $B = (4, 3, 1)$ is a plane π . Prove that π is perpendicular to line segment AB.

Exercise 3 Let r and s be skew lines through $A = (0, 1, 0)$ and $B = (1, 1, 0)$ and through $C = (-3, 1, -4)$ and $D = (-1, 2, -7)$, respectively. Find the equation of the line t intersecting both r and s , and parallel to the vector $\vec{v} = (1, -5, -1)$.

Exercise 4 Prove that the line r is contained in the plane π , where $r : x = -1 + m, y = -1 + m, z = 3m$ and $\pi : x + 2y - z + 3 = 0$.

Exercise 5 Find the symmetric point P' for the point $P = (2, 1, 0)$ with respect to the line $r : x = 1 + t, y = 2 - t, z = 1 + t$.

Exercise 6 Find the asymptotes for the hyperbola $4y^2 - x^2 = 1$.