

Find the parametric equations of a straight line p passing through the point $A [2;-1;2]$ perpendicularly to the plane $\pi: x - y + z + 13 = 0$.

Find the parametric equations and the general equation of a plane $\rho = ABC$, $A [-4;0;2]$, $B [-2;1;1]$, $C [1;-3;-2]$.

Find the general equation of a plane α which passes through the point $A [2;1;4]$ and which is parallel to the plane $\beta: x - 2y + 5z + d = 0$.

Find the general equation of a plane σ which passes through the point $A [1;2;0]$ and which is perpendicular to the straight line $p: x = 3 - t; y = 4 + 2t; z = 1 - 2t; t \in \mathbf{R}$.

Consider a regular square pyramid $ABCDV$ with vertices $D [0;0;0]$, $A [4;0;0]$, $B [4;4;0]$, $V [2;2;6]$. Find the general equation of a plane BCV .

Consider two vectors $\mathbf{u} = (3;-2)$, $\mathbf{v} = (-1;b)$. Determine the parameter b so that :

a) $\mathbf{u} \perp \mathbf{v}$ **b)** $\mathbf{u} \parallel \mathbf{v}$ **c)** $\mathbf{u} = -3\mathbf{v}$ **d)** $|\mathbf{u}| = |\mathbf{v}|$

Find the vector \mathbf{u} that is perpendicular to the vector $\mathbf{v} = (3;4)$ and the size of which is 15.

Prove that the triangle ABC , $A [16;1;-2]$, $B [-9;1;-2]$, $C [0;1;10]$, is right-angled. Find its perimeter, area and the size of its internal angles.

Consider three points $A [0;1;2]$, $B [1;2;0]$, $C [2;0;1]$.

- Prove that the points A , B , C form a triangle.
- Find the size of the internal angle α .
- Find the length of the median of side a and the coordinates of the centroid T .
- Find the perimeter of the triangle ABC .
- Find the area of the triangle ABC .

Find the point P that divides the line segment AB in a ratio 2:3, tj. $|AP| : |BP| = 2 : 3$. $A = (2,1)$, $B = (3,9)$.

Determine intersection line of the plane $2x + y - z + 1 = 0$, $y - z = 0$. [-1/2, t, t]

Find the traces of a plane $6x + 2y + 3z - 6 = 0$

Examine, if the following points are collinear:

a. (8,3), (-6, -3), (15, 6) Yes

b. (1, 1), (4, -1), (-5,5) Yes

Determine the distance from $A(-4, 4)$ to the line $e: 2x + y - 3 = 0$. $\frac{7\sqrt{5}}{5}$

Determine the distance between the parallel lines with equations $2x + y + 3 = 0$ and $2x + y - 2 = 0$
 $\sqrt{5}$

Determine the equation of the line parallel to line $e: 5x + 12y - 11 = 0$ and at a distance 1
from $A(-2, 1)$ $5x + 12y - 15 = 0$
 $5x + 12y + 11 = 0$

Find out whether the vectors (2,-3,1), (3,2,0) are perpendicular to each other. Yes

Determine the perpendicular bisector of the segment [AB], $A = (2,1)$, $B = (-2, -1)$

Determine the coordinates of the centroid (center of area) of triangles:

a. $A(5,1)$, $B(-1,5)$, $C(-7, 2)$. (-1, 2)

b. $O(0,0)$, $P(5,0)$, $Q(1,6)$ (2,2)

Determine the direction vector and the slope of line through (-2, 7) and (1, -8)

Determine the direction vector and the slope of the coordinates lines x, y.