

**SOLVE TASKS USING OCTAVE ONLINE,
THEN SOLVE TASKS USING BASIC FORMULAS IN YOUR EXERCISES
AND COMPARE SOLUTIONS**

Task 1. Coordinates of vertices A, B, C and D of the pyramid $ABCD$ are given.

Find:

- 1) lengths of edges DA, DB, DC as modules of vectors $\overrightarrow{DA}, \overrightarrow{DB}, \overrightarrow{DC}$;
- 2) the angle D between edges DA and DB as the angle between two vectors $\vec{a} = \overrightarrow{DA}$ and $\vec{b} = \overrightarrow{DB}$;
- 3) the cross product of $\vec{a} = \overrightarrow{DA}$ and $\vec{b} = \overrightarrow{DB}$, i.e. $\vec{c} = \vec{a} \times \vec{b} = \overrightarrow{DA} \times \overrightarrow{DB}$;
- 4) the area of ABD as $S = \frac{1}{2} |\vec{c}| = \frac{1}{2} \sqrt{c_x^2 + c_y^2 + c_z^2}$;
- 5) the mixed product of three vectors $\overrightarrow{DA}, \overrightarrow{DB}, \overrightarrow{DC}$;
- 6) the volume of the pyramid $ABCD$ as $V = \frac{1}{6} |(\overrightarrow{DA}, \overrightarrow{DB}, \overrightarrow{DC})|$;
- 7) coordinates of M as the midpoint of side DA .

Variant 1

Task 1. Coordinates of vertices of the pyramid $ABCD$ are given as: $A(-2,1,3)$, $B(1,-2,3)$, $C(2,1,-1)$ and $D(3,3,3)$.

Variant 2

Task 1. Coordinates of vertices of the pyramid $ABCD$ are given as: $A(2,-1,1)$, $B(5,5,4)$, $C(3,2,-1)$ and $D(4,1,3)$.

Variant 3

Task 1. Coordinates of vertices of the pyramid $ABCD$ are given as: $A(4,1,3)$, $B(2,3,5)$, $C(6,2,3)$ and $D(3,7,2)$.

Variant 4

Task 1. Coordinates of vertices of the pyramid $ABCD$ are given as: $A(3,0,6)$, $B(1,-3,2)$, $C(3,2,5)$ and $D(2,2,5)$.

Variant 5

Task 1. Coordinates of vertices of the pyramid $ABCD$ are given as: $A(2,1,-4)$, $B(1,-2,3)$, $C(1,-2,-3)$ and $D(5,-2,1)$.

Variant 6

Task 1. Coordinates of vertices of the pyramid $ABCD$ are given as: $A(4,4,3)$, $B(2,1,-1)$, $C(-2,2,1)$ and $D(1,-3,2)$.

Variant 7

Task 1. Coordinates of vertices of the pyramid $ABCD$ are given as: $A(2,3,1)$, $B(4,1,-2)$, $C(6,3,7)$ and $D(5,4,-8)$.

Variant 8

Task 1. Coordinates of vertices of the pyramid $ABCD$ are given as: $A(3,1,4)$, $B(-1,6,1)$, $C(-1,1,6)$ and $D(0,4,-1)$.

Variant 9

Task 1. Coordinates of vertices of the pyramid $ABCD$ are given as: $A(3,4,5)$; $B(1,2,1)$; $C(-2,-3,6)$; $D(3,-6,-3)$.

Variant 10

Task 1. Coordinates of vertices of the pyramid $ABCD$ are given as: $A(7, 5, -6)$, $B(2, -5, 3)$; $C(-3, 2, 4)$; $D(1, -2, 2)$.

Variant 11

Task 1. Coordinates of vertices of the pyramid $ABCD$ are given as: $A(-2, 1, 3)$, $B(1, -2, 3)$, $C(2, 1, -1)$ and $D(3, 3, 3)$.

Variant 12

Task 1. Coordinates of vertices of the pyramid $ABCD$ are given as: $A(2, -1, 1)$, $B(5, 5, 4)$, $C(3, 2, -1)$ and $D(4, 1, 3)$.

Variant 13

Task 1. Coordinates of vertices of the pyramid $ABCD$ are given as: $A(4, 1, 3)$, $B(2, 3, 5)$, $C(6, 2, 3)$ and $D(3, 7, 2)$.

Variant 14

Task 1. Coordinates of vertices of the pyramid $ABCD$ are given as: $A(3, 0, 6)$, $B(1, -3, 2)$, $C(3, 2, 5)$ and $D(2, 2, 5)$.

Variant 15

Task 1. Coordinates of vertices of the pyramid $ABCD$ are given as: $A(2, 1, -4)$, $B(1, -2, 3)$, $C(1, -2, -3)$ and $D(5, -2, 1)$.

Variant 16

Task 1. Coordinates of vertices of the pyramid $ABCD$ are given as: $A(4, 4, 3)$, $B(2, 1, -1)$, $C(-2, 2, 1)$ and $D(1, -3, 2)$.

Variant 17

Task 1. Coordinates of vertices of the pyramid $ABCD$ are given as: $A(2, 3, 1)$, $B(4, 1, -2)$, $C(6, 3, 7)$ and $D(5, 4, -8)$.

Variant 18

Task 1. Coordinates of vertices of the pyramid $ABCD$ are given as: $A(3, 1, 4)$, $B(-1, 6, 1)$, $C(-1, 1, 6)$ and $D(0, 4, -1)$.

Variant 19

Task 1. Coordinates of vertices of the pyramid $ABCD$ are given as: $A(3, 4, 5)$; $B(1, 2, 1)$; $C(-2, -3, 6)$; $D(3, -6, -3)$.

Variant 20

Task 1. Coordinates of vertices of the pyramid $ABCD$ are given as: $A(7, 5, -6)$, $B(2, -5, 3)$; $C(-3, 2, 4)$; $D(1, -2, 2)$.

Variant 21

Task 1. Coordinates of vertices of the pyramid $ABCD$ are given as: $A(-2, 1, 3)$, $B(1, -2, 3)$, $C(2, 1, -1)$ and $D(3, 3, 3)$.

Variant 22

Task 1. Coordinates of vertices of the pyramid $ABCD$ are given as: $A(2, -1, 1)$, $B(5, 5, 4)$, $C(3, 2, -1)$ and $D(4, 1, 3)$.

Variant 23

Task 1. Coordinates of vertices of the pyramid $ABCD$ are given as: $A(4, 1, 3)$, $B(2, 3, 5)$, $C(6, 2, 3)$ and $D(3, 7, 2)$.

Variant 24

Task 1. Coordinates of vertices of the pyramid $ABCD$ are given as: $A(3, 0, 6)$, $B(1, -3, 2)$, $C(3, 2, 5)$ and $D(2, 2, 5)$.

Variant 25

Task 1. Coordinates of vertices of the pyramid $ABCD$ are given as: $A(2, 1, -4)$, $B(1, -2, 3)$, $C(1, -2, -3)$ and $D(5, -2, 1)$.

Variant 26

Task 1. Coordinates of vertices of the pyramid $ABCD$ are given as: $A(4, 4, 3)$, $B(2, 1, -1)$, $C(-2, 2, 1)$ and $D(1, -3, 2)$.

Variant 27

Task 1. Coordinates of vertices of the pyramid $ABCD$ are given as: $A(2, 3, 1)$, $B(4, 1, -2)$, $C(6, 3, 7)$ and $D(5, 4, -8)$.

Variant 28

Task 1. Coordinates of vertices of the pyramid $ABCD$ are given as: $A(3,1,4)$, $B(-1,6,1)$, $C(-1,1,6)$ and $D(0,4,-1)$.

Variant 29

Task 1. Coordinates of vertices of the pyramid $ABCD$ are given as: $A(3,4,5)$; $B(1,2,1)$; $C(-2,-3,6)$; $D(3,-6,-3)$.

Variant 30

Task 1. Coordinates of vertices of the pyramid $ABCD$ are given as: $A(7,5,-6)$, $B(2,-5,3)$; $C(-3,2,4)$; $D(1,-2,2)$.