

Volumes and determinants

1. a) Find the volume of the parallelepiped with edges given by the origin vectors $\langle 1, 2, 4 \rangle$, $\langle 2, 0, 0 \rangle$, $\langle 1, 5, 2 \rangle$

$$\begin{vmatrix} 1 & 2 & 4 \\ 2 & 0 & 0 \\ 1 & 5 & 2 \end{vmatrix} = -2(4 - 20) = 32 \text{ unit}^3$$

2. We know $\begin{vmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 9 \end{vmatrix} = 0$.

the volume of parallelepiped with these vectors as edges is zero.

What does this say about the origin vectors $\langle 1, 2, 3 \rangle$, $\langle 4, 5, 6 \rangle$ and $\langle 7, 8, 9 \rangle$?

MIT OpenCourseWare
<http://ocw.mit.edu>

18.02SC Multivariable Calculus
Fall 2010

For information about citing these materials or our Terms of Use, visit: <http://ocw.mit.edu/terms>.