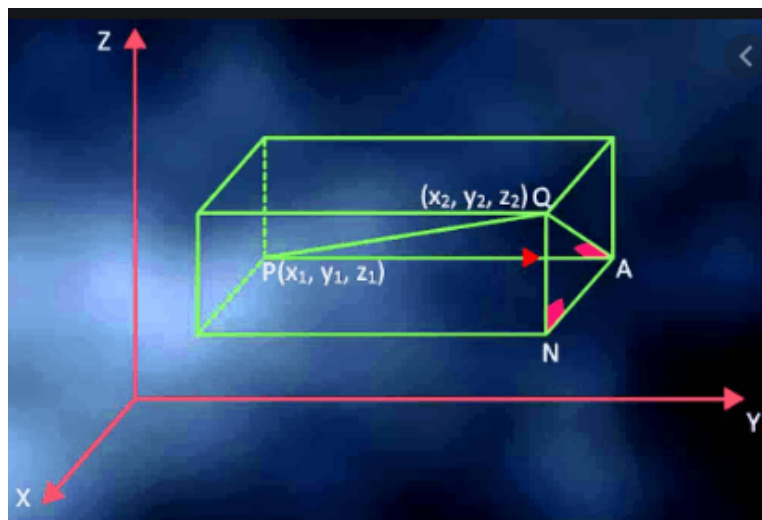


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## Introduction to 3D Geometry: History, What is Meant by 3 Dimensional

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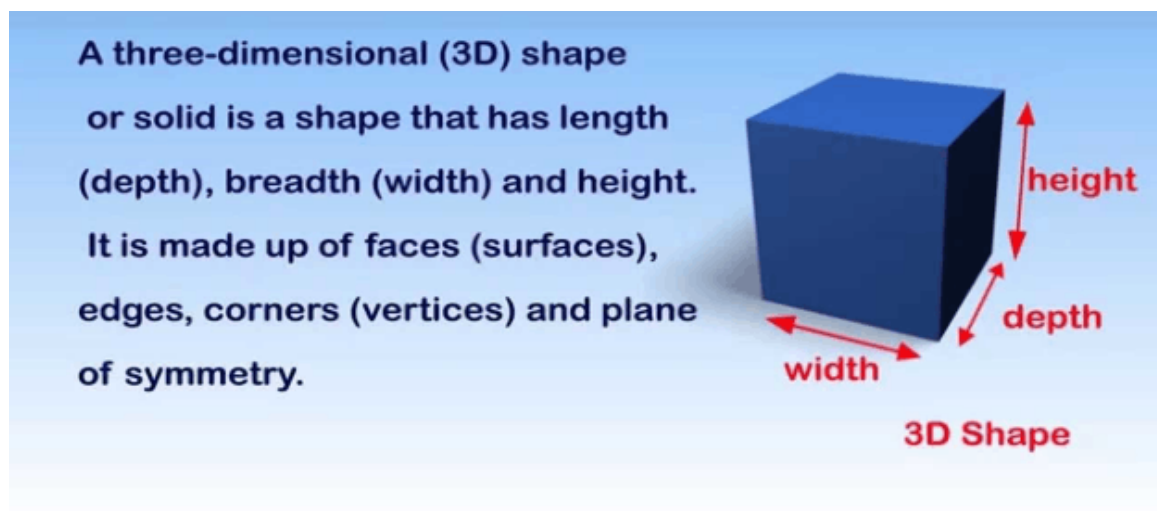


- A line passing through the origin making angles  $p$ ,  $q$  and  $r$  with  $x$ ,  $y$ ,  $z$ -axes then, the cosine of these angles, namely,  $\cos p$ ,  $\cos q$ , and  $\cos r$  are known as direction cosines of the line  $L$ .
- Any idea what does Geometry mean? This word is actually derived from the Greek word 'geometron'. Here, 'geometron' is actually made of two words – Geo and Metron.
- Any 3 numbers proportional to the direction cosines are known as the direction ratios of that line.
- So geometry is the mathematical study of all shapes and figures. In this following chapter let us study in detail about three dimensional geometry.
- If  $x$ ,  $y$ ,  $z$  are direction cosines and  $p$ ,  $q$ ,  $r$  are direction ratios of a line, then  $a = \lambda l$ ,  $b = \lambda m$ , and  $c = \lambda n$ , [where  $\lambda$  belongs to  $R$ ].

## History

- Euclid of Alexandria, who is said to be a student at the Academy by Plato was the one who wrote a treatise in 13 books.
- He named it 'The Elements of Geometry' , in which he presented geometry in an ideal axiomatic form that we now know as Euclidean geometry.

## What is Meant by 3 Dimensional?



- In geometry, one can define a three-dimensional shape as a solid figure or an object or shape having three dimensions.
- They are length, width and height.
- A three-dimensional shape can be defined as a solid figure or an object or shape that has three dimensions – length, width and height. Unlike two-dimensional shapes, three-dimensional shapes have thickness or depth.
- Always remember that unlike two-dimensional shapes, three-dimensional shapes consist of thickness or depth.