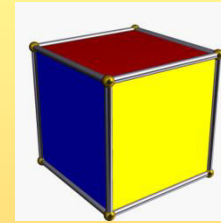




Cube And Cubical Dice Test

Cube And Cubical Dice Test

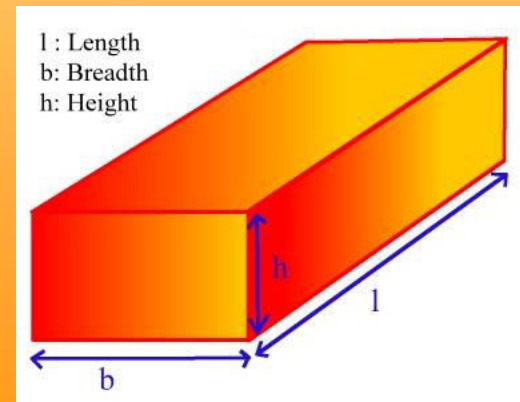
In geometry, a **cube** is a three-dimensional solid object bounded by six square faces, facets or sides, with three meeting at each vertex.



Six-sided dice are cube-shaped.



A **cuboid** is a solid figure bounded by six faces, forming a convex polyhedron.





Cube And Cubical Dice Test

Important points:

1. In a cube or a cuboid there are six faces in each.
2. In a cube length, breadth and height are same while in cuboid these are different.
3. In a cube the number of unit cubes = $(\text{side})^3$ and in cuboid the number of unit cube = $(l \times b \times h)$.



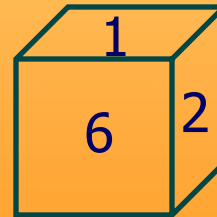
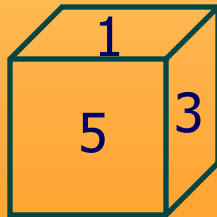
Dice

Important points:

1. Two opposite faces can not be adjacent to one another.

For example:

In figure, faces 6, 2, 3 and 5 are adjacent to the face with number 1. Hence the faces with numbers 6, 2, 5 and 3 cannot be opposite to the face with number 1. Therefore the remaining face with number 4 will be opposite to the face with number 1.



Dice

Important points:

2. If two different positions of a dice are shown and one of the two common faces is in same position then of the remaining faces will be opposite to each other.

For example:

In figure, in both the positions two faces 1 and 3 are common. The remaining faces are 5 and 6. Hence they are opposite faces.



Dice

Important points:

3. If in two different positions of dice, the positions of a common face be the same, then each of the opposite faces of the remaining faces will be in the same position.

For example:

In figure, Positions of 5 is same. Therefore opposite of 1 is 6 and opposite of 3 is 2.



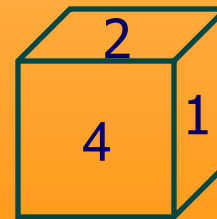
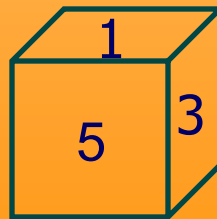
Dice

Important points:

4. If in two different positions of a dice, the position of the common face be not the same, then opposite face of the common face will be that which is not shown on any face in these two positions. Besides, the opposite faces of the remaining faces will not be the same.

For example:

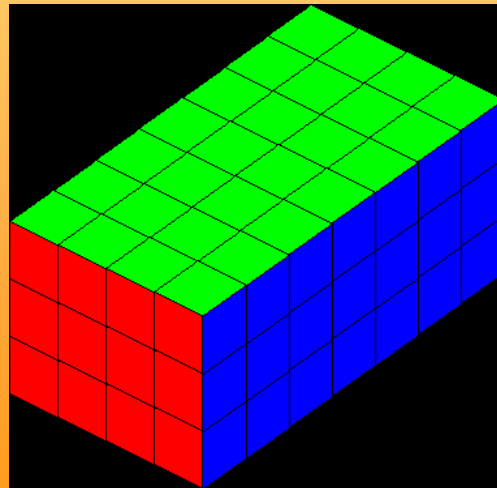
In figure, the face with number 1 in two positions of a die is not same. The face with number 6 is not shown. Hence the face opposite the face with number 1 is 6. Besides the opposite face of 3 will be the face with number 4 and opposite face to face 5 will be the face with number 2.



Cube And Cubical Dice Test

For an $n \times n \times n$ stack of cubes, with three colours painted on them and same colours painted on opposite faces, we have:

- i. The number of cubes having 3 surfaces painted is always 8.
- ii. The number of cubes having 2 surfaces painted is equal to $12(n - 2)$.
- iii. The number of cubes having only 1 surface painted is equal to $6(n - 2)^2$
- iv. The number of cubes having no surfaces painted is equal to $(n - 2)^2$



Cube And Cubical Dice Test

Example: Consider a cuboid of dimensions $4 \times 4 \times 3$ cm.

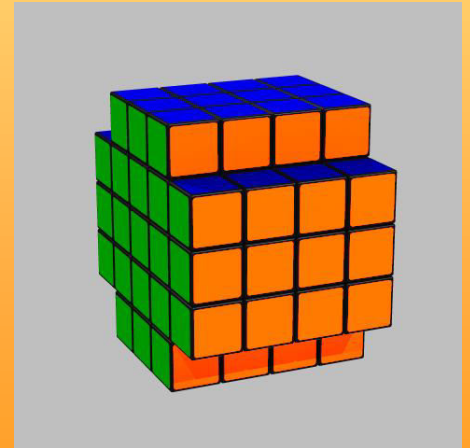
- (i) The opposite faces of dimensions 4×3 are coloured orange.
- (ii) The opposite faces of other dimensions 4×3 are coloured green.
- (iii) The opposite faces of dimensions 4×4 are coloured blue.
- (iv) Now the cuboid is cut into cubes of side 1 cm.

No. of small cubes having only one face coloured

$$\begin{aligned} &= 2 \times 4 + 2 \times 2 + 2 \times 2 \\ &= 8 + 4 + 4 \\ &= 16 \end{aligned}$$

No. of small cubes having only two faces coloured

$$\begin{aligned} &= 4 \text{ from the front} + 4 \text{ from the back} + 2 \\ &\quad \text{from the left} + 2 \text{ from the right} \\ &= 12 \end{aligned}$$





Thanks...