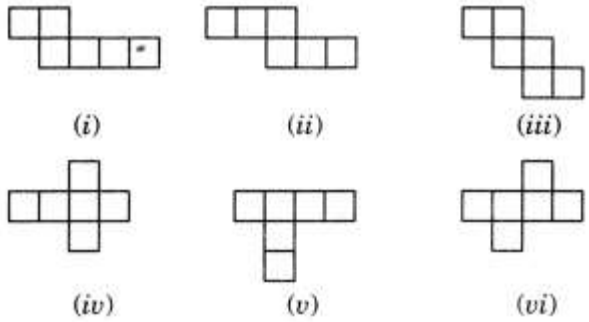
CHAPTER-15

Visualising Solid Shapes

Ex 15.1:-

Question 1

Identify the nets which can be used to make cubes (Cut out copies of the nets and try it):



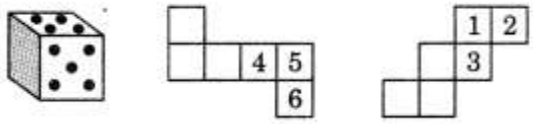
Solution:

Fig. (ii), (iii), (iv) and (vi) can be used to make cubes.

Question 2

Dice are cubes with dots on each face. Opposite faces of a die always have a total of seven dots on them.

Here are two nets to make dice (cubes); the number inserted in each square indicate the number of dots in that box.

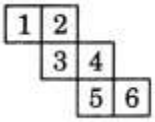


Insert suitable number in the blanks, remembering that the number on the opposite faces should total to 7.

Solution:

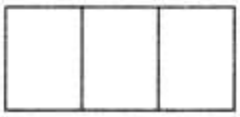
Ex 15.1 Class 7 Maths Question 3.

Can this be a net for a die? Explain your answer.

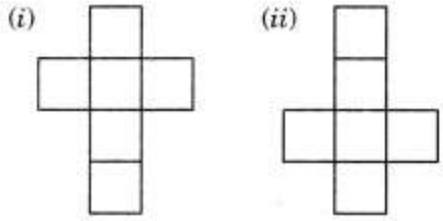


Solution:
If one pair of opposite faces will have 1 and 4 on them, then their total does not come 7.
If we take 3 and 6 on the opposite faces of the die, then the total does not come 7.
Hence, this cannot be for a die.

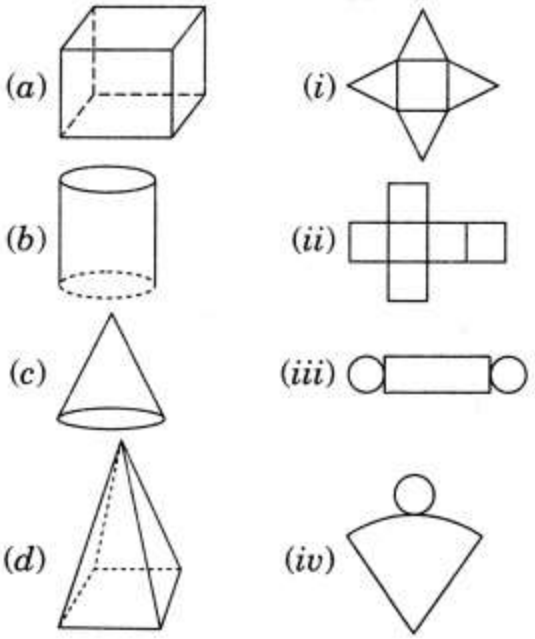
Question 4
Here is an incomplete net for making a cube. Complete it in atleast two different ways. Remember that a cube has six faces. How many are there in the net here? (Give two separate diagrams. If you like, you may use a squared sheet for easy manipulation).



Solution:
There are three faces in the given net.



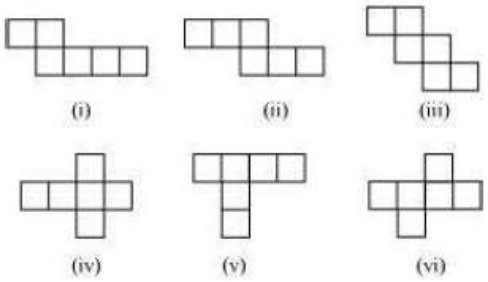
Question 5
Match the nets with appropriate solids:



Solution:
(a) (ii)
(b) (iii)
(c) (iv)
(d) (i)

Question 1:

Identify the nets which can be used to make cubes (cut out copies of the nets and try it):



Answer:

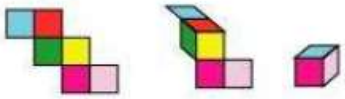
(i)The given net can be folded as follows.

When the faces that are in sky blue colour and in pink colour are folded to make a cube, they will be overlapping each other.

(ii) The given net can be folded as follows.

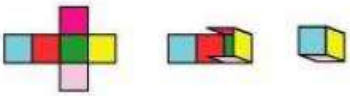
A cube can thus be formed in the above way.

(iii) The given net can be folded as follows.



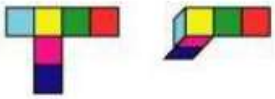
A cube can thus be formed in the above way.

(iv) The given net can be folded as follows.



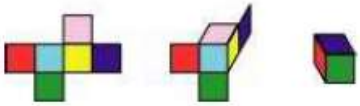
A cube can thus be formed in the above way.

(v) The given net can be folded as follows.



When the faces that are in blue colour and in red colour are folded to make a cube, they will be overlapping each other.

(vi) The given net can be folded as follows.

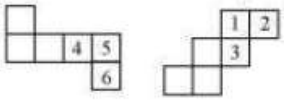


A cube can thus be formed in the above way.

Question 2:

Dice are cubes with dots on each face. Opposite faces of a die always have a total of seven dots on them.

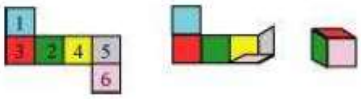
Here are two nets to make dice (cubes); the numbers inserted in each square indicate the number of dots in that box.



Insert suitable numbers in the blanks, remembering that the number on the opposite faces should total to 7.

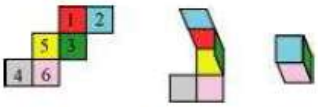
Answer:

(i) The numbers can be inserted as follows so as to make the given net into a net of a dice.



It can be observed that the sum of the opposite faces is 7.

(ii)The numbers can be inserted as follows so as to make the given net into a net of a dice.

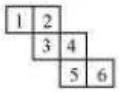


It can be observed that the sum of the opposite faces is 7.

Question 3:

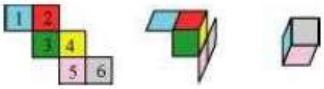
Can this be a net for a die?

Explain you answer



Answer:

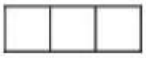
The given net can be folded as follows.



It can be observed that the opposite faces of the dice so formed have 2 and 5, 1 and 4, 3 and 6 on them. The sum of the numbers on the opposite faces comes to 7, 5, 9 respectively. However, in case of a dice, the sum of the numbers on the opposite faces should be 7. Hence, this net is not of a dice.

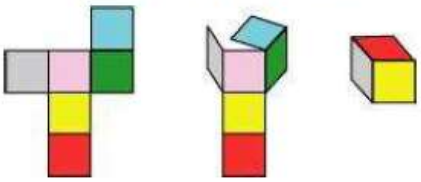
Question 4:

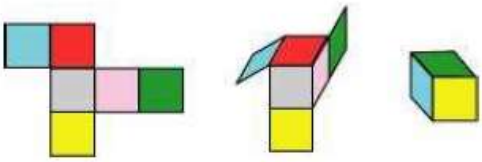
Here is an incomplete net for making a cube. Complete it in at least two different ways. Remember that a cube has six faces. How many are there in the net here? (Give two separate diagrams. If you like, you may use a squared sheet for easy manipulation.)



Answer:

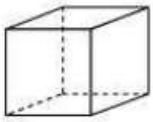
There are 3 faces in the given net. The given net can be completed as follows.

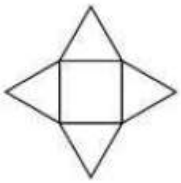




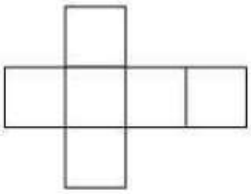
Question 5:

Match the nets with appropriate solids:

(a) 

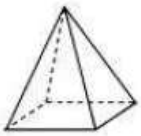
(i) 

(b) 

(ii) 

(c) 

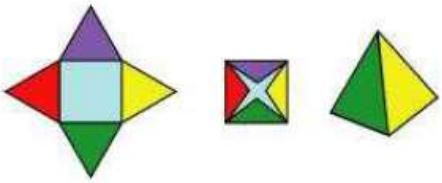
(iii) 

(d) 

(iv) 

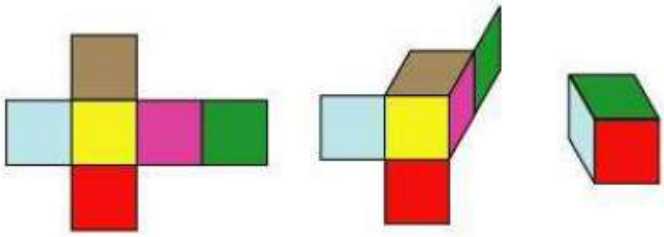
Answer:

Consider net (i). It can be folded as follows.



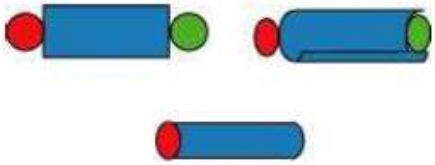
It is a net of a pyramid. Hence, (d) is the correct matching option.

Consider net (ii). It can be folded as follows.



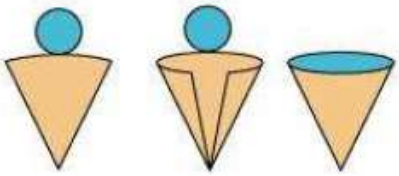
It is a net of a cube. Hence, (a) is the correct matching option.

Consider net (iii). It can be folded as follows.



It is a net of a cylinder. Hence, (b) is the correct matching option.

Consider net (iv). It can be folded as follows.

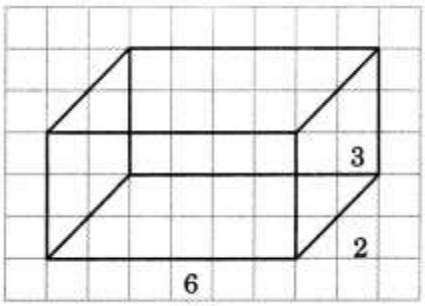


It is a net of a cone. Hence, (c) is the correct matching option.

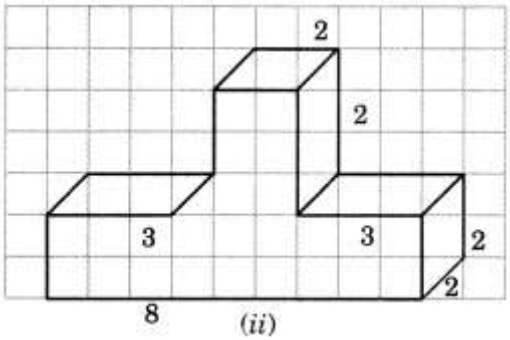
Ex 15.2:-

Question 1

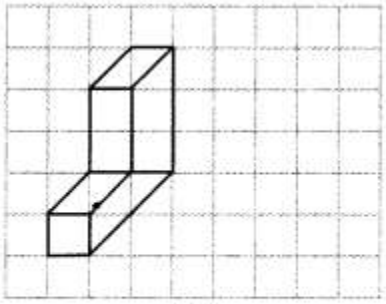
Use isometric dot paper and make an isometric sketch for each one of the given shapes:



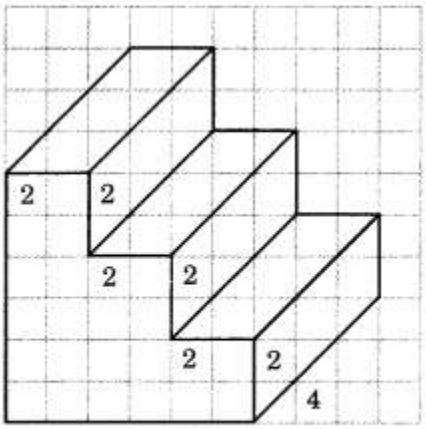
(i)



(ii)

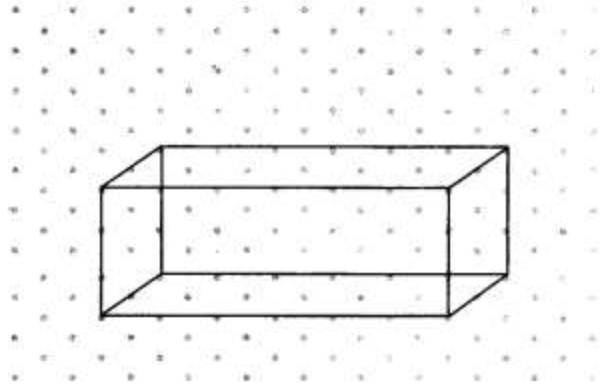


(iii)

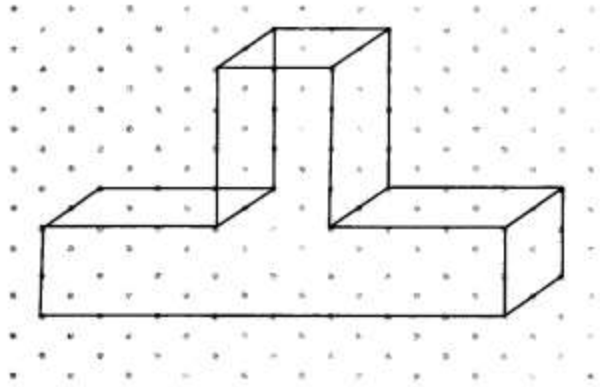


(iv)

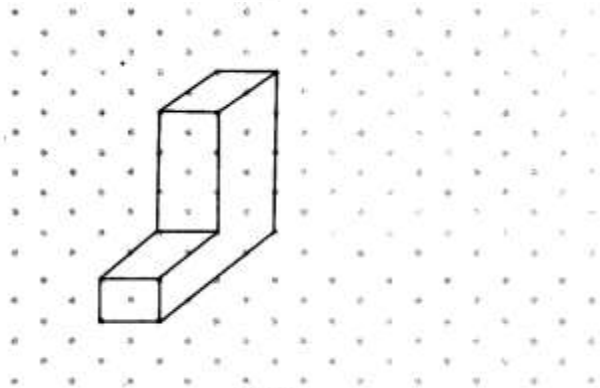
Solution:



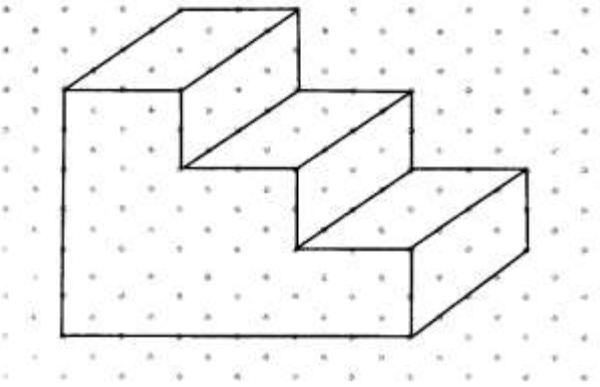
(i)



(ii)



(iii)

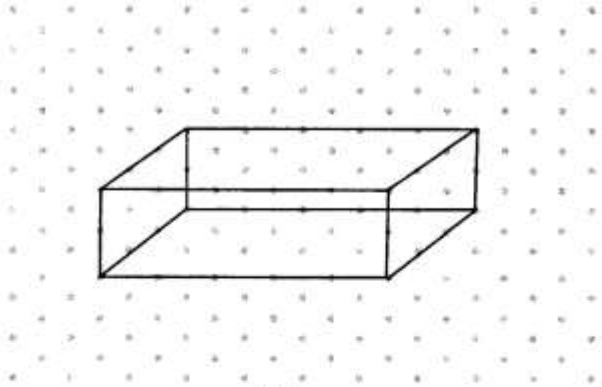


(iv)

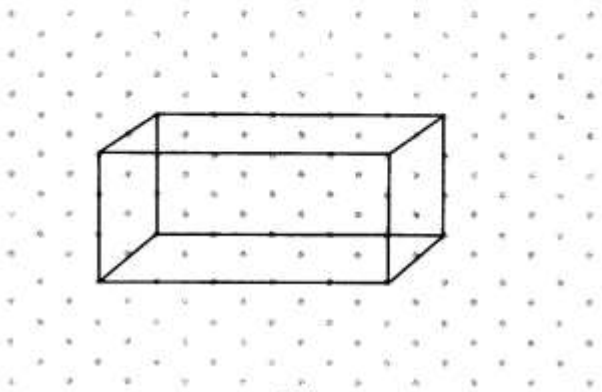
Question 2

The dimensions of a cuboid are 5 cm, 3 cm and 2 cm. Draw three different isometric sketches of this cuboid.

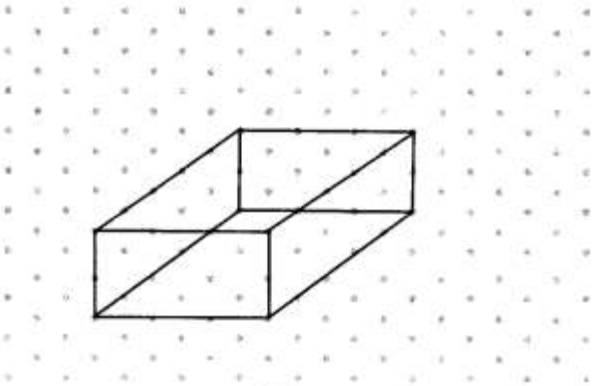
Solution:



(*i*)



(*ii*)



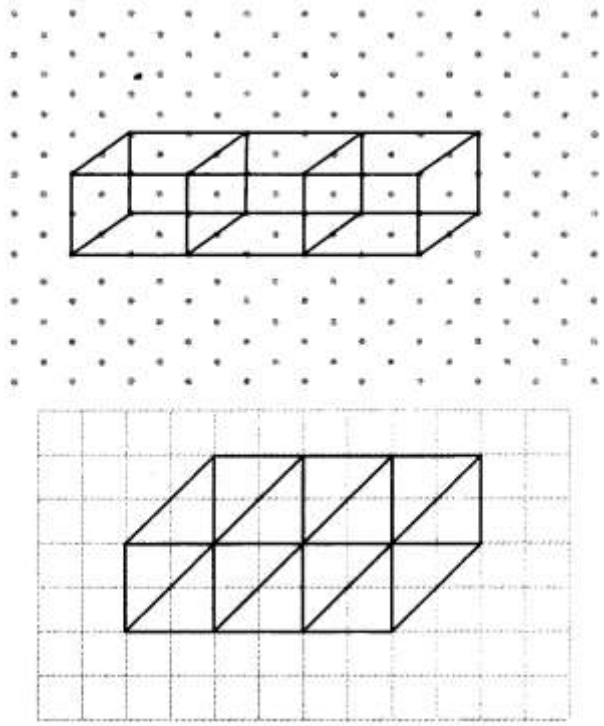
(*iii*)

Question 3

Three cubes with 2 cm edge are placed side by side to form a cuboid. Sketch an oblique or isometric sketch of this cuboid.

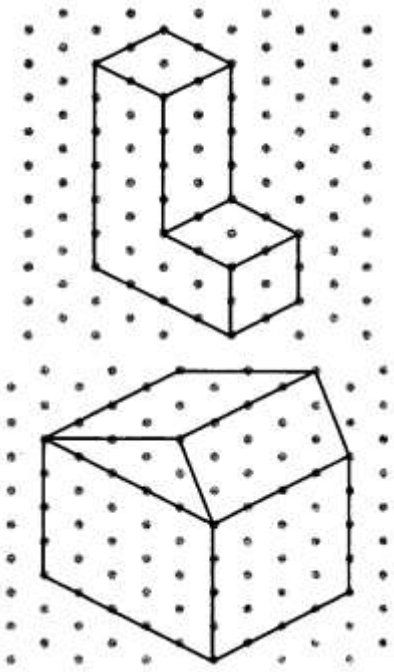
Solution:

In the given figure, we have an isometric sketch of a cuboid formed by placing three cubes each of 2 cm edge side by side.

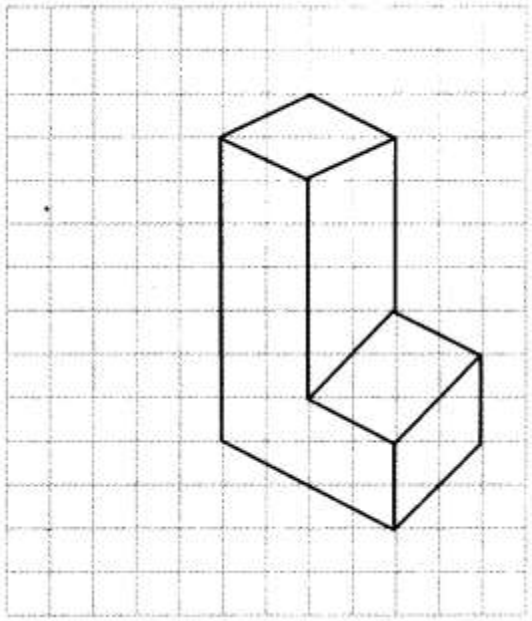


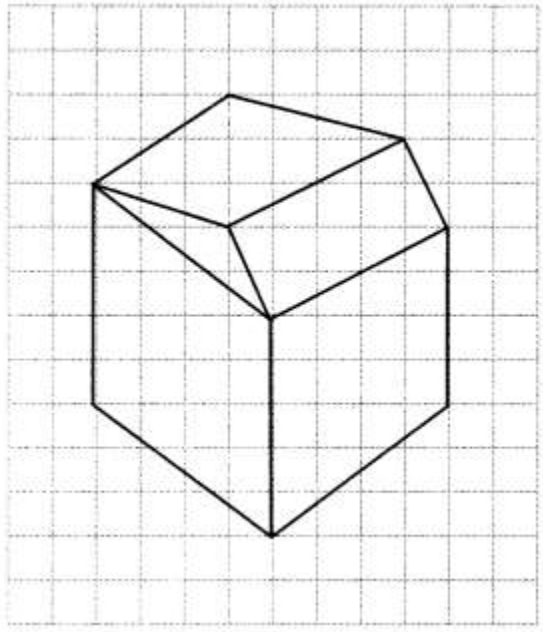
Question 4

Make an oblique sketch for each one of the given isometric shapes:



Solution:





Question 5

Give (i) an oblique sketch and (ii) an isometric sketch for each of the following:

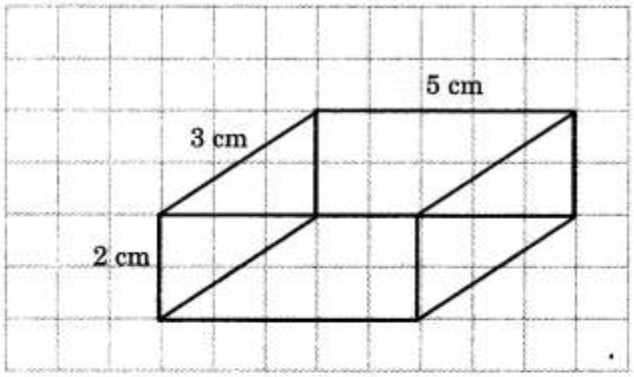
(a) A cuboid of dimensions 5 cm, 3 cm and 2 cm. (Is your sketch unique?)

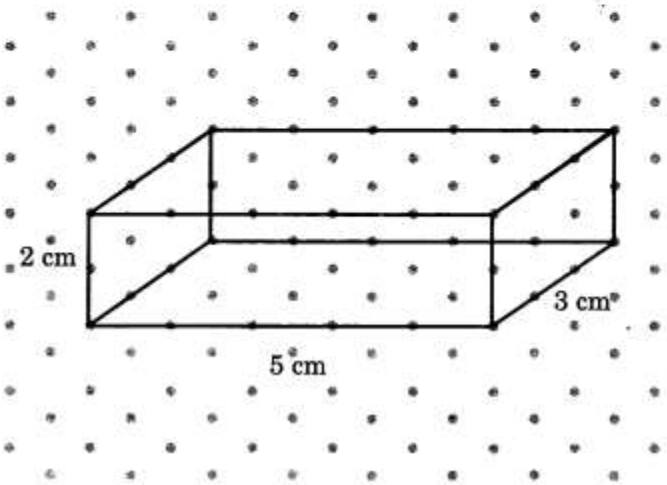
(b) A cube with an edge 4 cm long.

An isometric sheet is attached at the end of the book. You could try to make on it some cubes or cuboids of dimensions specified by your friend.

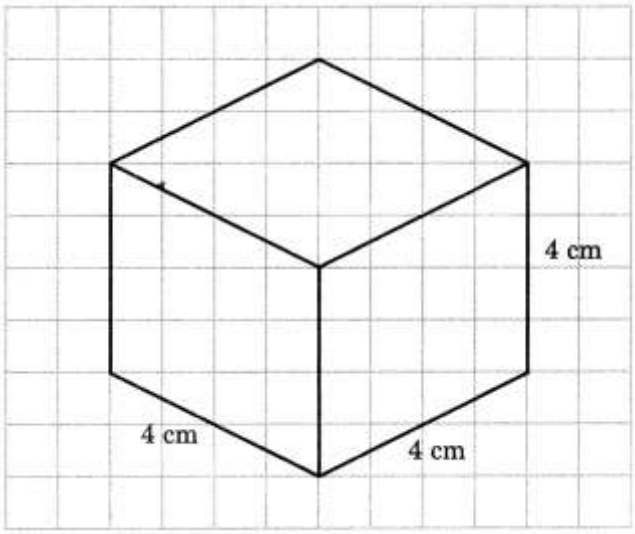
Solution:

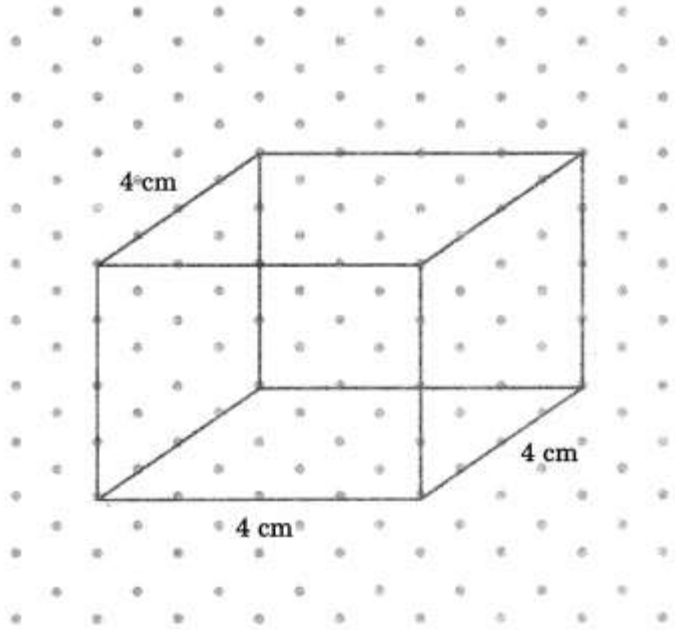
(a)



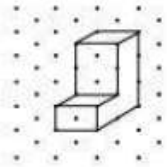


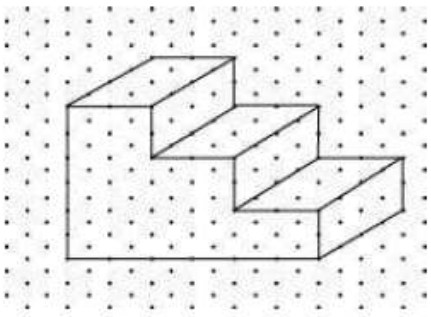
(b)





No, this sketch is not unique.





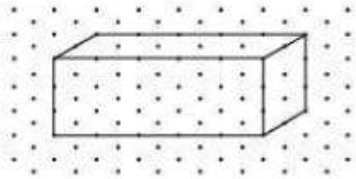
(iii) **(iv)**

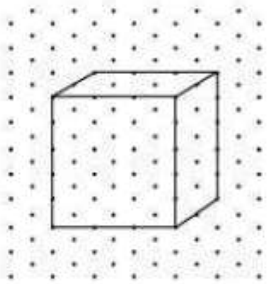
Question 2:

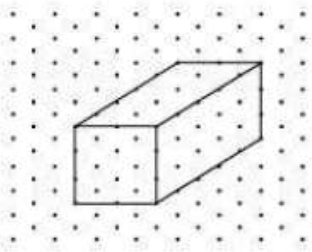
The dimensions of a cuboid are 5 cm, 3 cm and 2 cm. Draw three different isometric sketches of this cuboid.

Answer:

3 isometric sketches of the given cuboid can be drawn as follows.





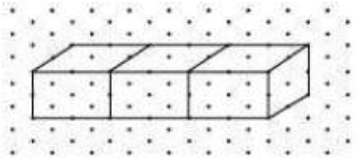


Question 3:

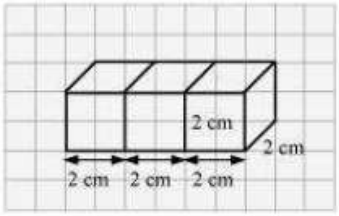
Three cubes each with 2 cm edge are placed side by side to form a cuboid. Sketch an oblique or isometric sketch of this cuboid.

Answer:

When three cubes, each of 2 cm edge, are placed side by side, a cuboid with dimensions as 6 cm, 2 cm, and 2 cm will be formed.



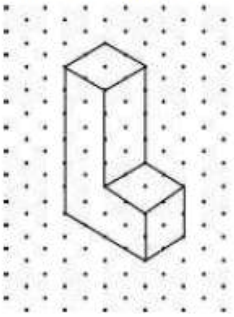
Isometric sketch

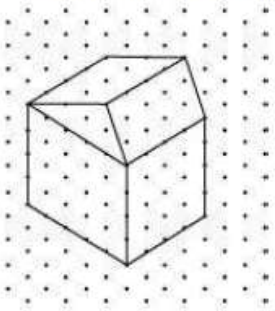


Oblique sketch

Question 4:

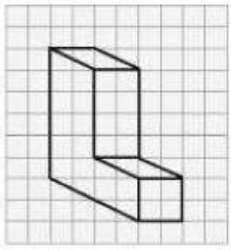
Make an oblique sketch for each one of the given isometric shapes:

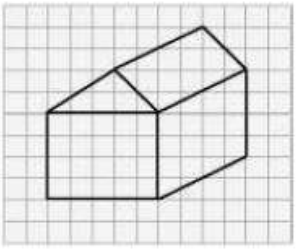




Answer:

The oblique sketch of these figures will be as follows.





Question 5:

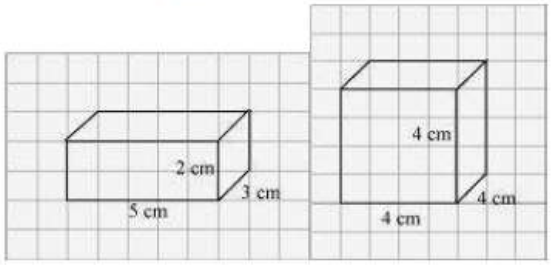
Give (i) an oblique sketch and (ii) an isometric sketch for each of the following:

(a) A cuboid of dimensions 5 cm, 3 cm and 2 cm. (Is your sketch unique?)

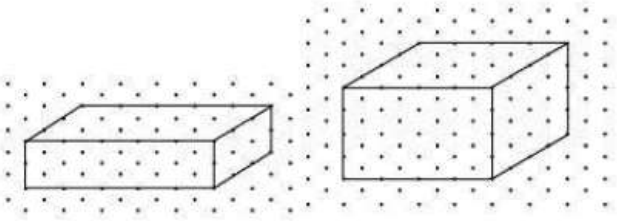
(b) A cube with an edge 4 cm long.

Answer:

(i) Oblique sketch



(ii) Isometric sketch

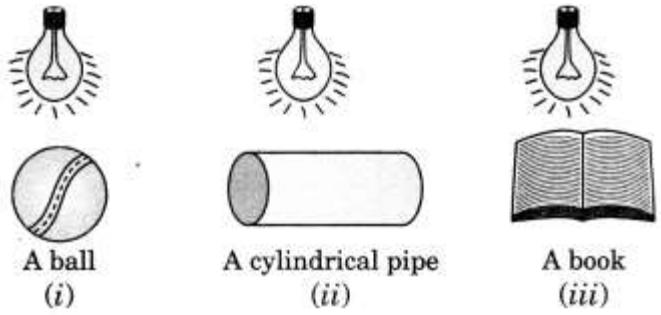


The sketch for the cuboid is not unique. The cuboid can also be drawn by taking the length as 3 cm or 2 cm. This will lead to a different view of the same cuboid.

Ex 15.4:-

Question 1

A bulb is kept burning just right above the following solids. Name the shape of the shadows obtained in each case. Attempt to give a rough sketch of the shadow. (You may try to experiment first and then answer these questions).



Solution:

When the light falls just above the solids.

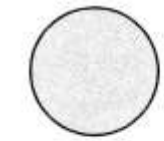
(i) A ball; the shadow looks like a circle.

(ii) A cylindrical pipe; the shadow looks like nearly rectangular.

(iii) A book; the shadow looks like nearly rectangular.

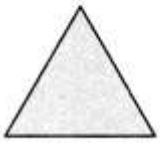
Question 2

Here are the shadows of some 3-D objects, when seen under the lamp of an overhead projector. Identify the solid(s) that match each shadow. (There may be multiple answers for these!)



A circle
(*i*)

A square
(*ii*)



A triangle
(*iii*)

A rectangle
(*iv*)

Solution:

(i) The given shadow corresponds to a sphere.
(ii) The given shadow corresponds to a cube.
(iii) The given shadow corresponds to a pyramid.
(iv) The given shadow corresponds to a cuboid or a cylinder.

Question 3

Examine if the following are true statements:

(i) The cube can cast a shadow in the shape of a rectangle.

(ii) The cube can cast a shadow in the shape of a hexagon.

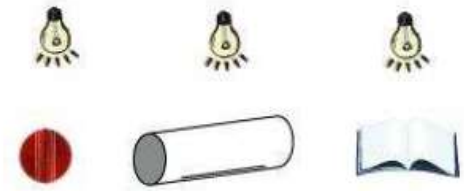
Solution:

(i) The given statement is true.

(ii) The given statement is false.

Question 1:

A bulb is kept burning just right above the following solids. Name the shape of the shadows obtained in each case. Attempt to give a rough sketch of the shadow. (You may try to experiment first and then answer these questions).



A ball (i) A cylindrical pipe (ii) A book (iii)

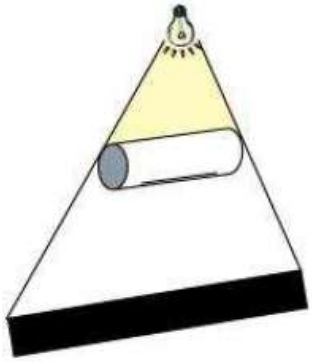
Answer:

The shapes of the shadows of these figures will be as follows.

(i) A ball

The shape of the shadow of a ball will be a circle.

(ii) A cylindrical pipe



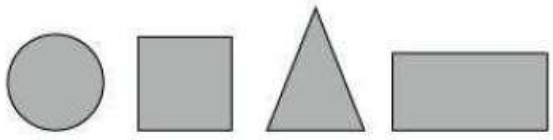
The shape of the shadow of a circular pipe will be a rectangle.

(iii) A book

The shape of the shadow of a book will be a rectangle.

Question 2:

Here are the shadows of some 3–D objects, when seen under the lamp of an overhead projector. Identify the solids (s) that match each shadow. (There may be multiple answers for these!)



Answer:

The given shadows can be obtained in case of the following objects.

i. Compact disk
ii. A dice
iii. Triangular pyramid
iv. Note Book

Question 3:

Examine if the following are true statements:

(i) The cube can cast a shadow in the shape of a rectangle.

(ii) The cube can cast a shadow in the shape of a hexagon.

Answer:

A cube can cast shadow only in the shape of a square. Therefore, any other shapes are not possible.