Functional Skills
Maths

Level 2

Recognise and use 2D representations of 3D objects

v1.0

Functional Skills Maths:
Level 2

Skill Standard:
6

Coverage and Range:

Recognise and use 2D representations of 3D objects.

- Recognise and use common 2D representations of 3D objects, for example in maps and plans.
- Solve problems involving 2D shapes and parallel lines, for example laying carpet tiles.[1]

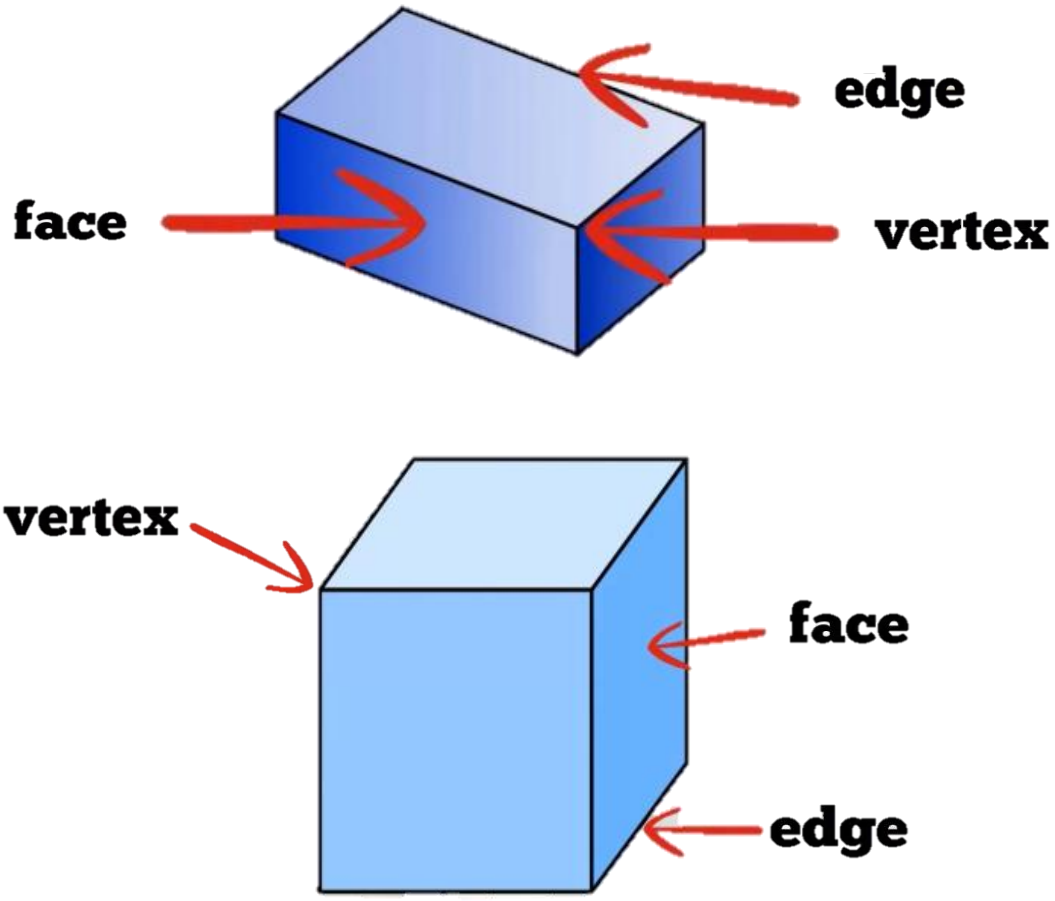
1 QCA Functional Skills guidance: amplification of the standards June 2008 QCA/08/3700

Explain the Skill

3D shapes

Three-dimensional shapes have width, depth and height. 3D shapes differ from 2D shapes because they have depth, they are not flat.

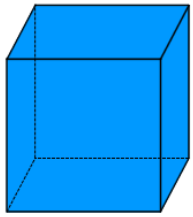
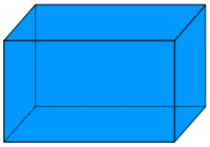
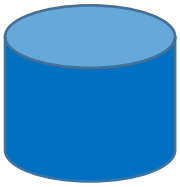
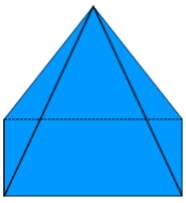
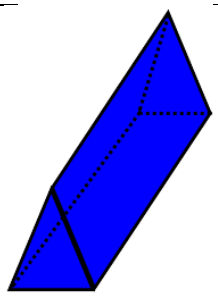
Three dimensional shapes have faces, edges and vertices. Where two faces meet it is called an edge and the point where three edges meet is called a vertex (plural vertices).



A cube has 6 faces, 12 edges and 8 vertices (plural of vertex).

Practise the Skill

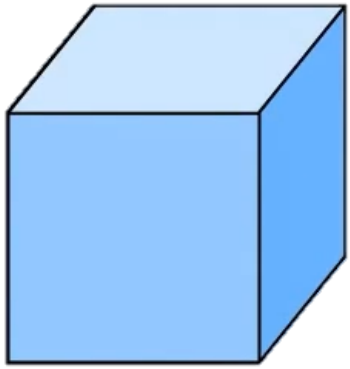
1) Complete the table.

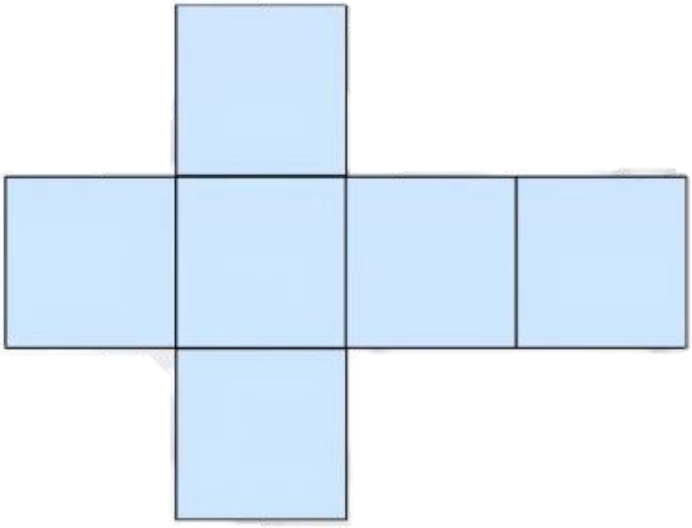
Shape	Name	Faces	Edges	Vertices
	Cube	6	12	8
	Cuboid	_____	_____	8
	Cylinder	3	_____	0
	Pyramid	5	_____	_____
	Triangular Prism	_____	9	_____

Explain the Skill

Nets

A net is a two-dimensional shape that can be folded up along its lines to form a three-dimensional shape.

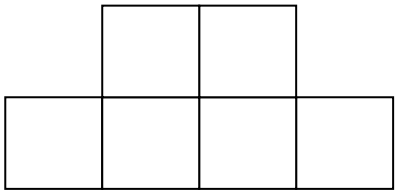


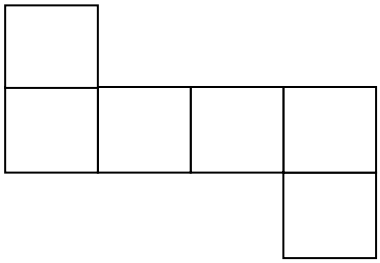


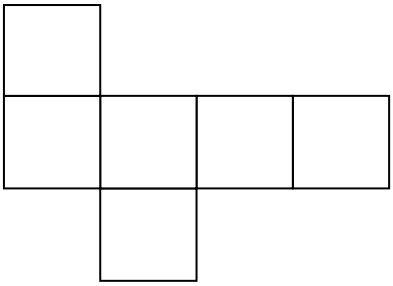
Practise the Skill

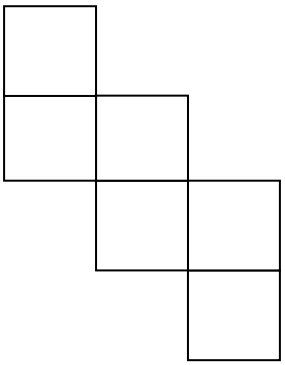
2D Representation of 3D Shapes

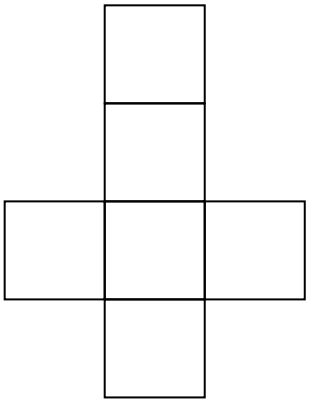
1) Which of these nets are **not** for a closed cube?

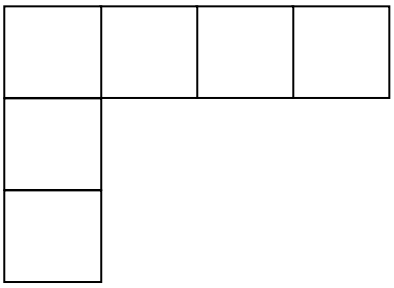


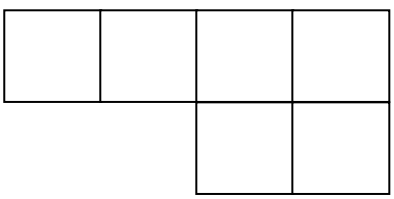


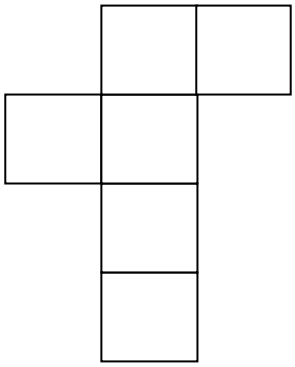




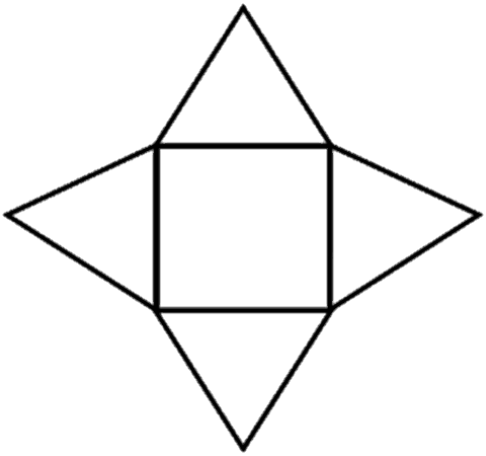






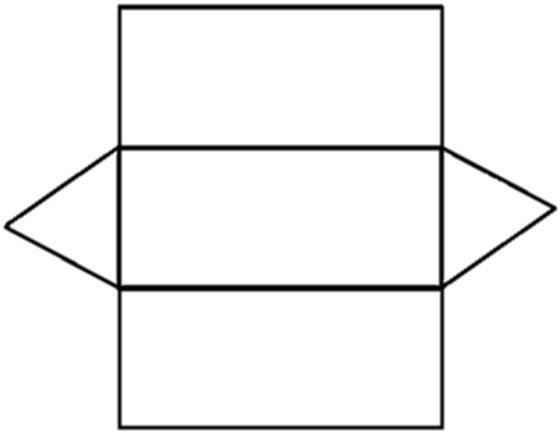


2) Name the 3D shape for the net.



_____

3) Name the 3D shape for the net.



_____

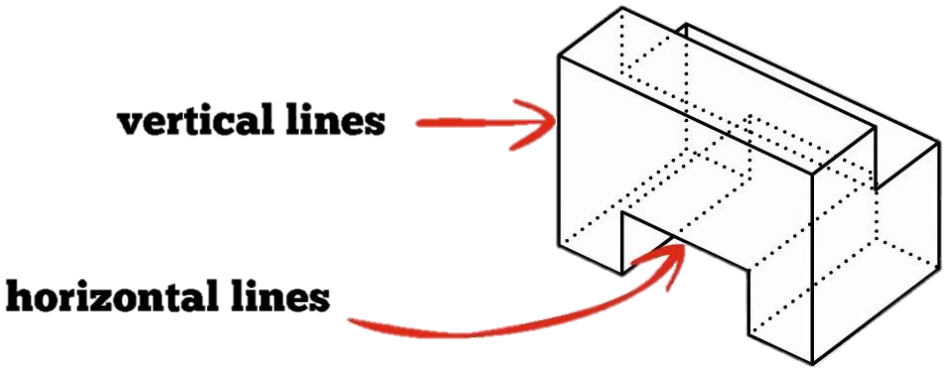
Explain the Skill

Plans

A plan is the view of an object from directly above. The view from the front is called a front elevation and the view from the side is called a side elevation.

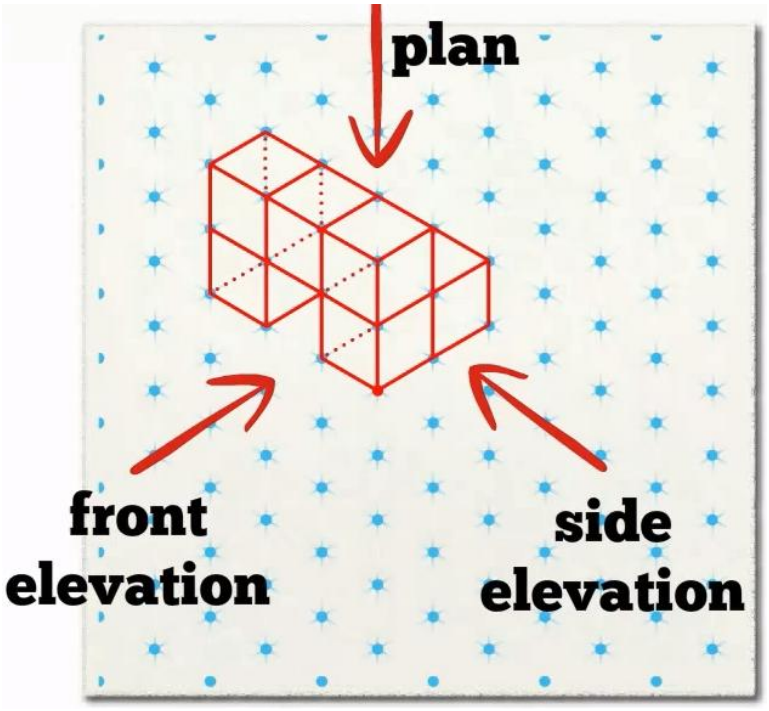
When drawing a 3D shape use isometric or dotty paper to help with this task.

In an isometric drawing, vertical lines are drawn vertically; however, horizontal lines are drawn at 30^{o} to the horizontal. Here is an example:



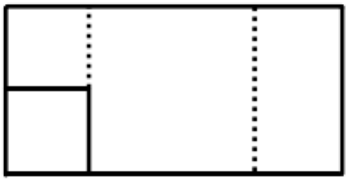
Isometric paper (usually called dotted paper) is designed to make drawing isometric views easier.

Isometric paper consists of rows of equally spaced dots aligned vertically; however, adjacent rows are off set to give diagonal lines at 30^{o} to the horizontal. Here is an example of an object on isometric paper.

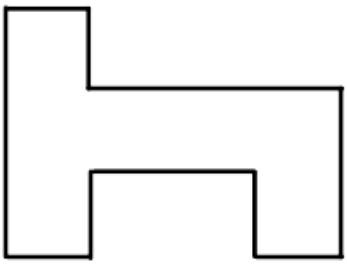


Practise the Skill

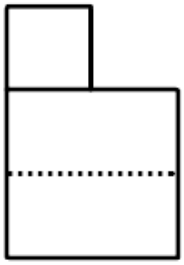
1) The following plan and elevations are the design of an office desk.



Plan

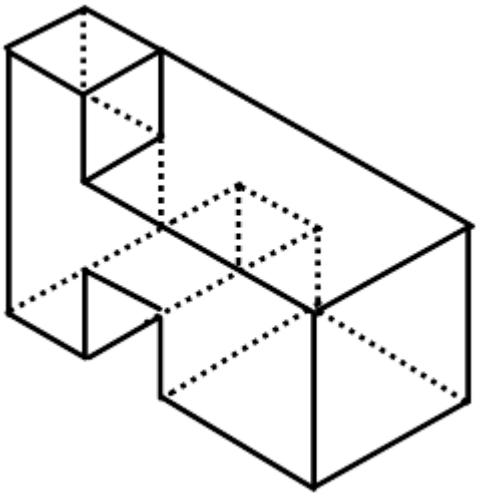


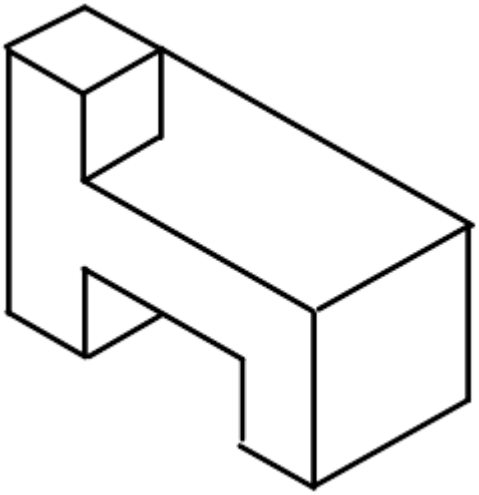
Front Elevation

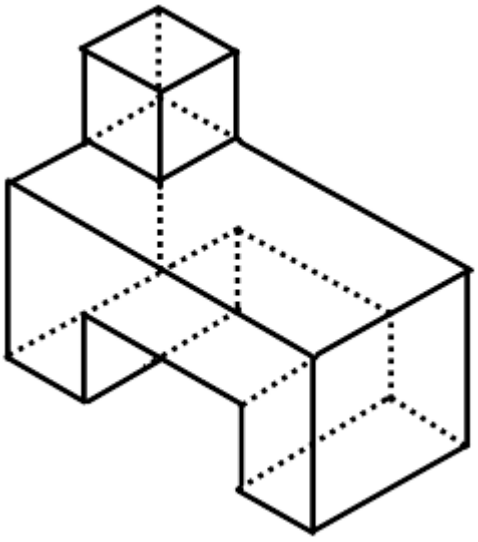


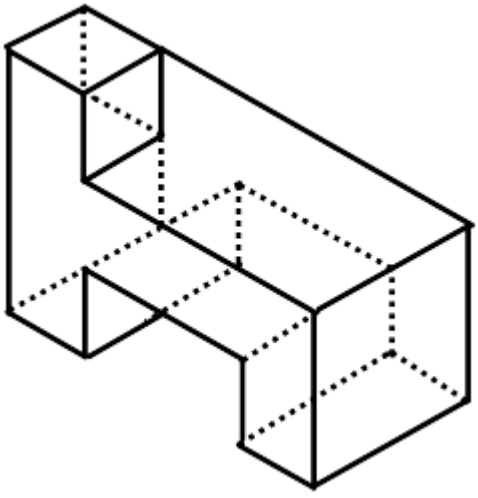
End Elevation

Which of the following is the correct 3D drawing of this desk? Circle your answer.







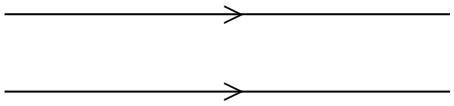


Explain the Skill

Parallel Lines

Parallel lines never meet; they are always the same distance apart from each other.

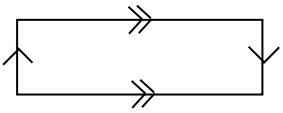
On diagrams, parallel lines can be shown with arrow heads marked on them.

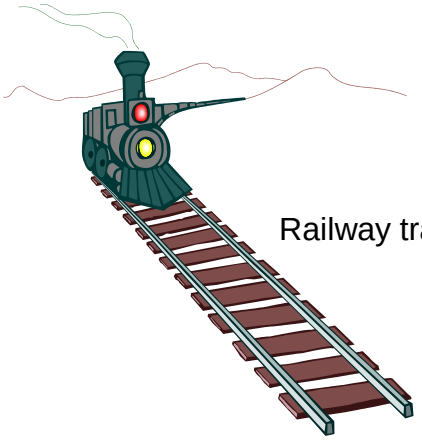


Examples of Parallel Lines

The sides of a door

The sides of a rectangle

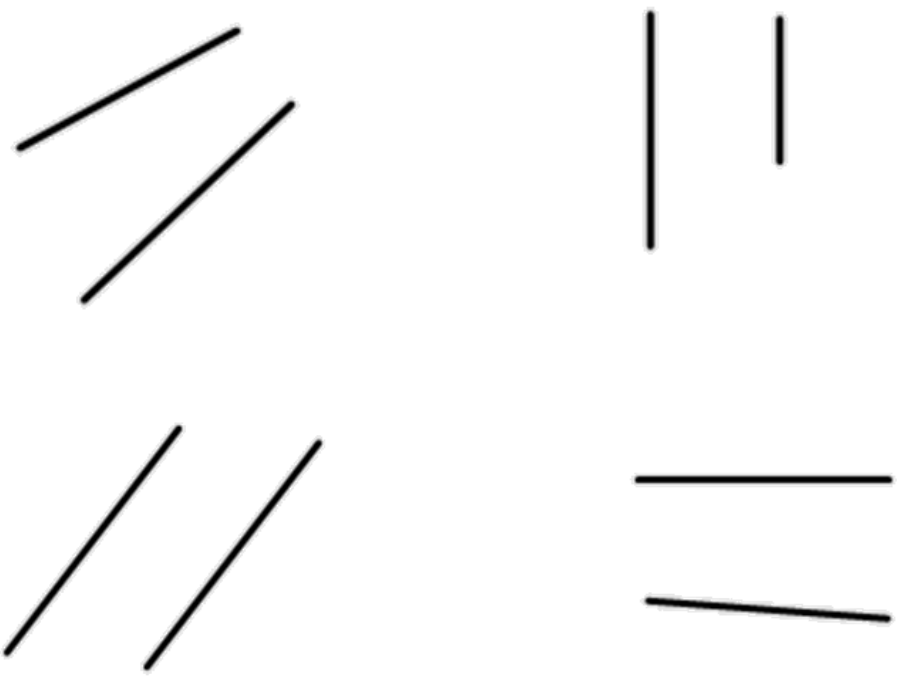




Railway tracks

Practise the Skill

1) Which pairs of lines are parallel? Circle your answer.



2) Which of these objects would you expect to have parallel lines?

Bookcase £1 coin Carpet Tile

Football Door

3) An office is replacing the carpet tiles in the kitchen. The kitchen is 5 m x 3 m. Each carpet tile measures 50 cm x 50 cm.

How many tiles are needed?

_____

4) Ben is tiling the floor in his bathroom. The area he is tiling is 4 m x 2 m. Each tile measures 400 mm x 400 mm.

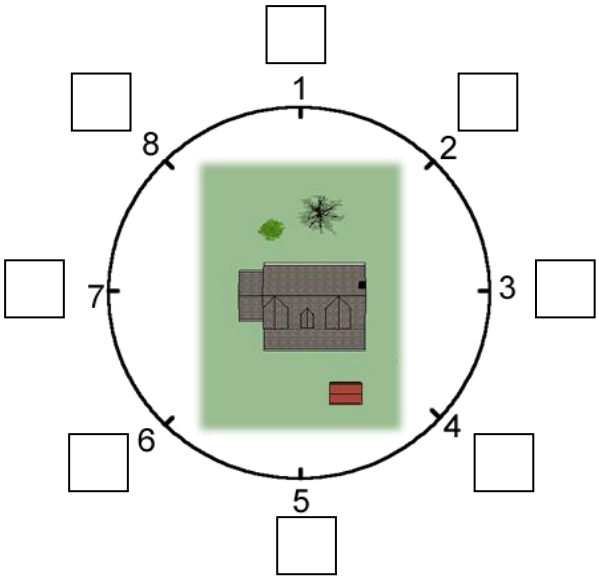
He has 45 tiles. Is this enough?

Circle your answer.

Yes / No

Apply the Skill

1) Jack and Jasmin have just bought a new house.
This is a plan view of their new house, which has a tree and a shed in the garden.
Try and picture the buildings and trees in the plan as 3 dimensional.



From which point do you see each of these views?

a) 

b) 

A= ___ B= ___

c) 

d) 

C= ___ D= ___

e) 

f) 

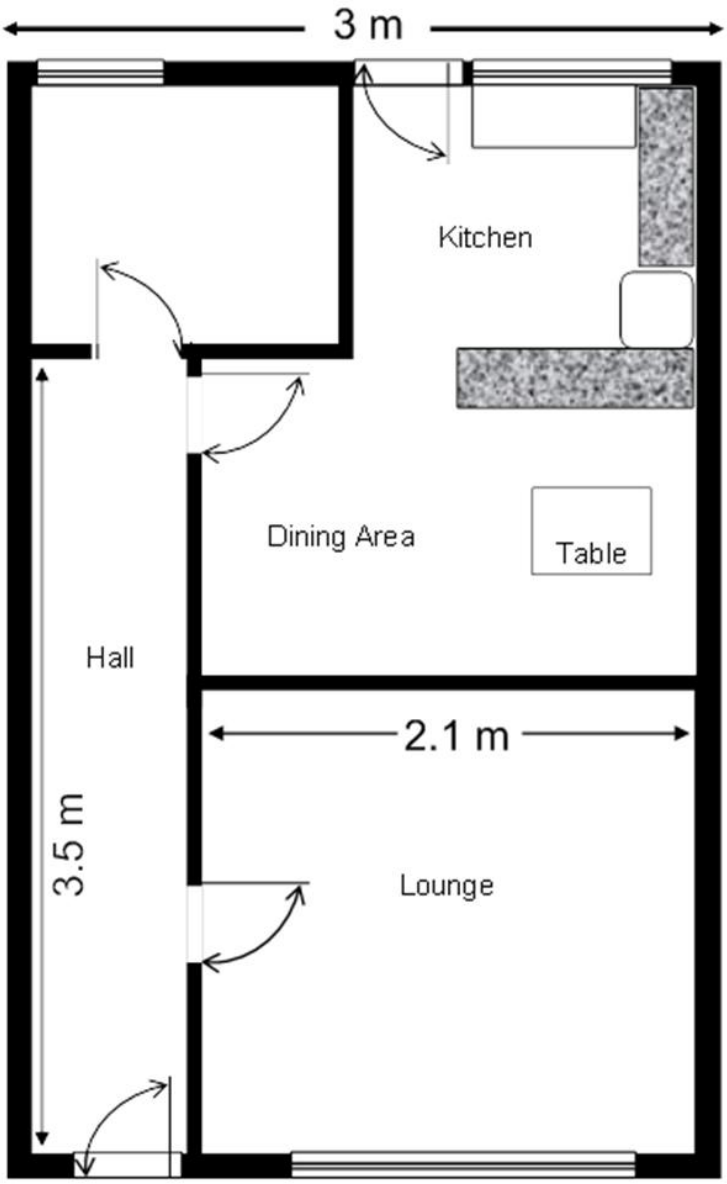
E= ___ F= ___

g) 

h) 

G= ___ H= ___

2) This is the ground floor of the house.



a) What view of the ground floor has been provided? Circle your answer.

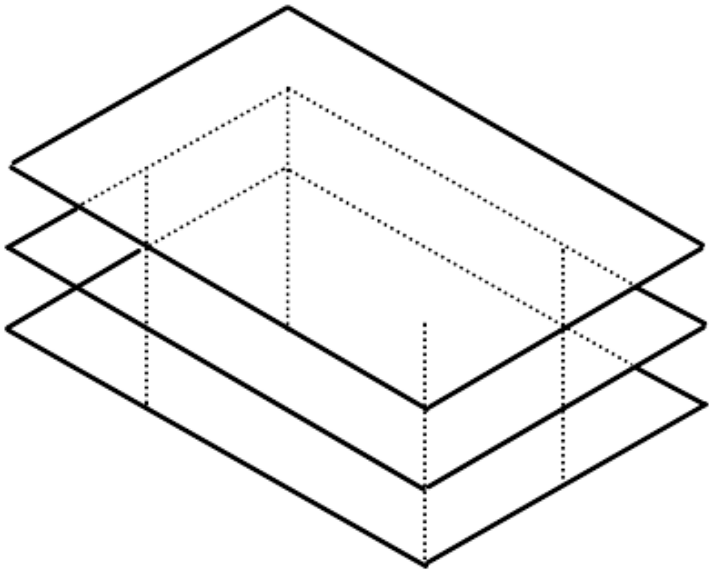
Front Elevation End Elevation Plan Isometric

Jack and Jasmin need to buy a new carpet for the hall of their home.

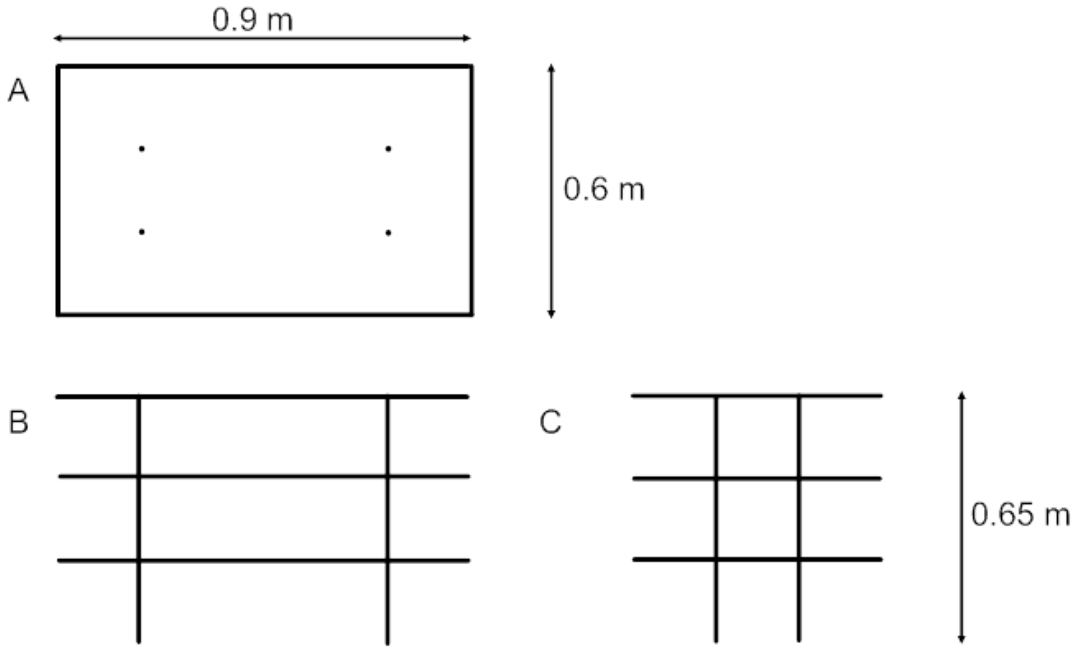
b) What are the dimensions of the required carpet?

_____ m by _____ m

3) This is the drawing of Jack and Jasmin's TV unit.



The following are plans and elevations of the TV unit.



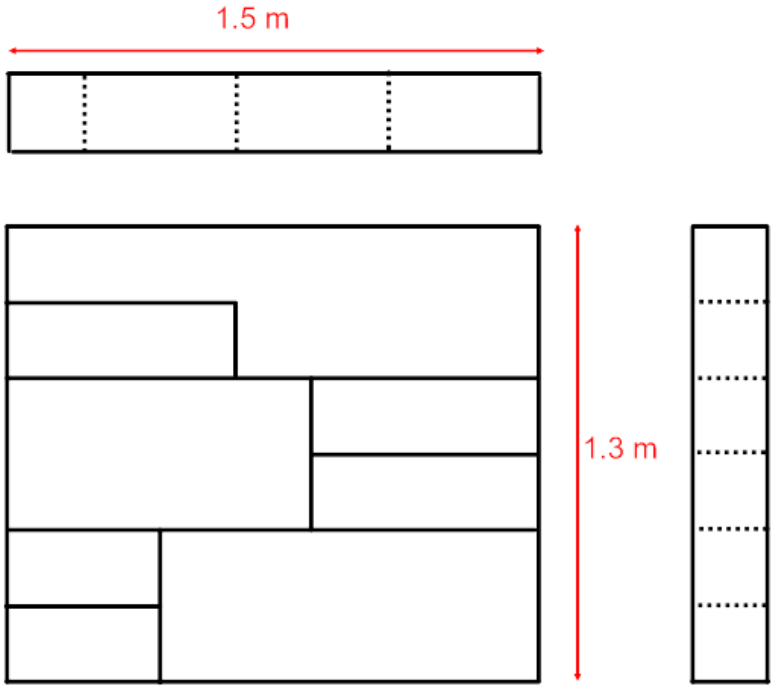
a) Which view shows what the TV unit would look like if drawn on the ground floor plan of the house?

A / B / C

b) How high is the TV unit?

_____ m

4) This is the plan, front elevation and end elevation of a bookcase they have just purchased.



Draw the bookcase on isometric paper.
Will the bookcase and TV unit fit along the wall in the lounge opposite the window?

Discuss your answers with your tutor

5) The manufactures of the TV unit pack it ready assembled in a cardboard cuboid box which is an exact fit. Draw the net of the cuboid showing dimensions.

Discuss your answers with your tutor.