

Orthographic Reading



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A missing view problem



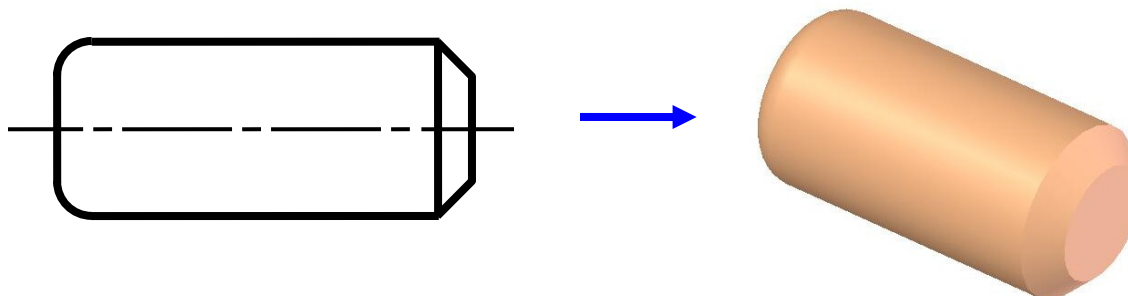
Introduction

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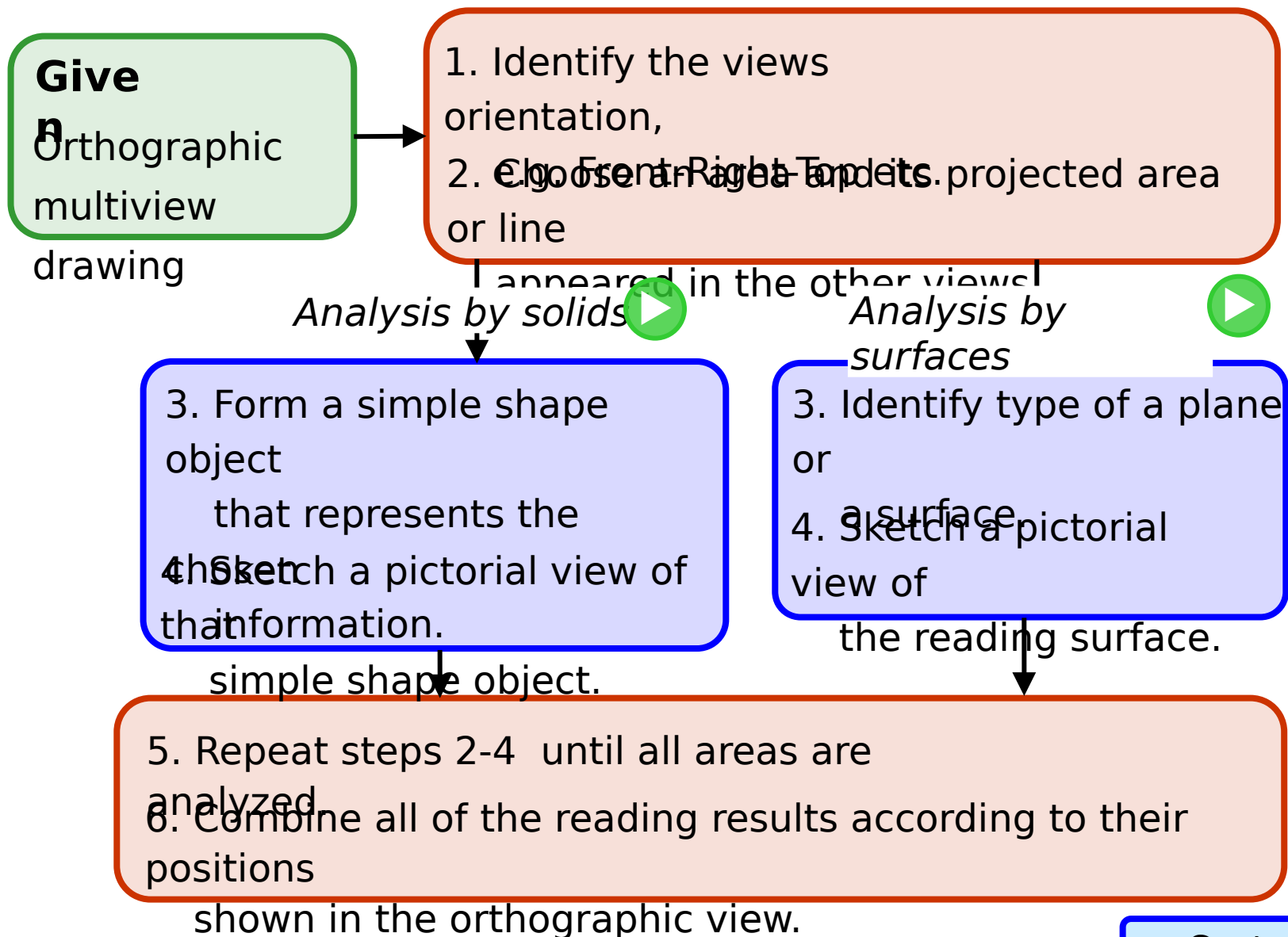
Scope

Orthographic reading covers 2 aspects

1. Gather an **information** from a given orthographic drawing.
 - Type of material
 - size and location of object's features, e.g. holes, slot, chamfer etc.
 - additional treatment of an object, e.g. heat treatment, surface finish
 - ...
 2. **Recognizing shape** of an object from a given orthographic drawing.
-



Visualization techniques





Visualization techniques :

Analysis by solids

Techniques

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Guidance

A successful application of this technique requires that

1. The readers have a stock of a pair of an orthographic views and a simple shape object.

Examples

2. The readers familiar with a generic object, i.e. an object that is modified from a simple shape object.

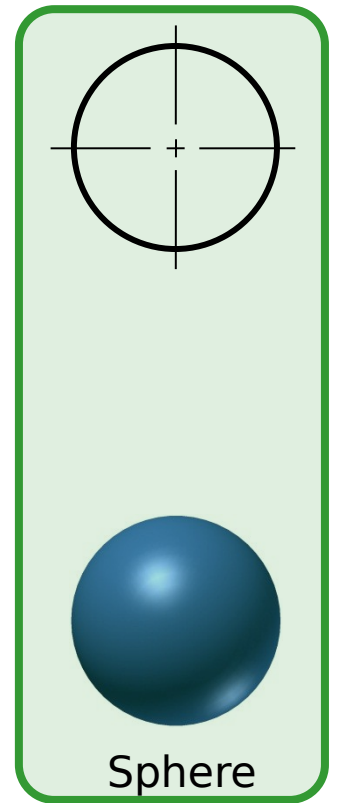
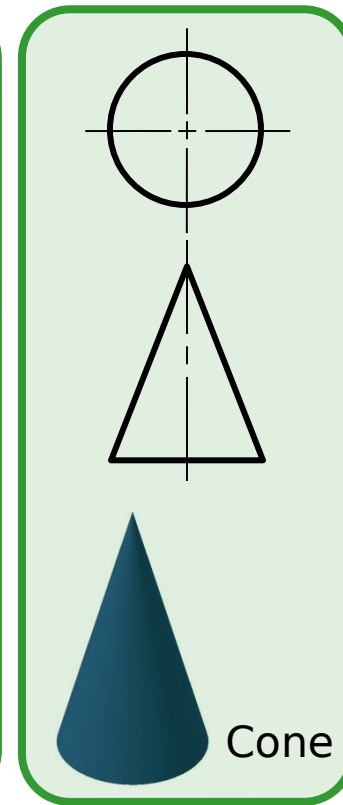
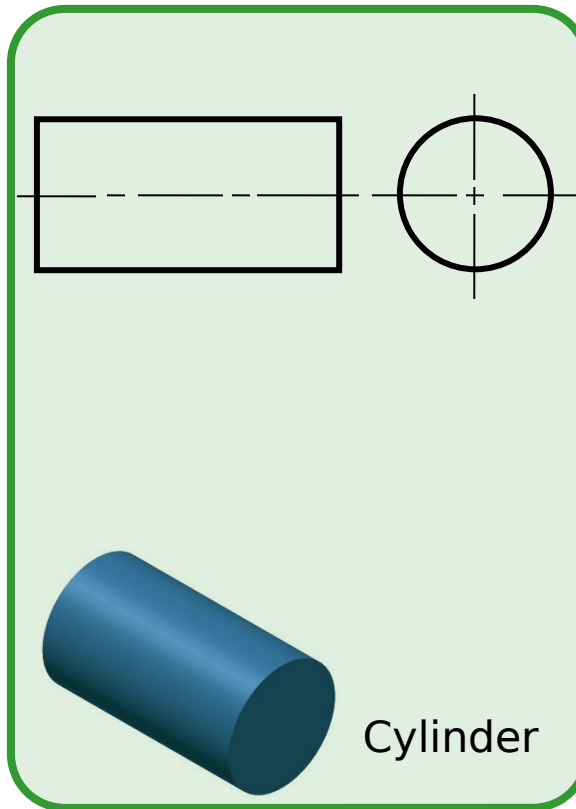
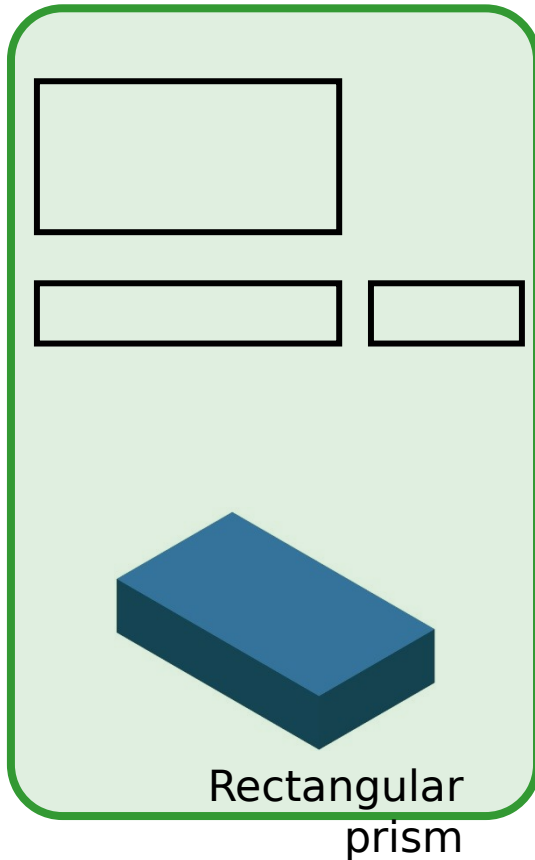
Examples

3. The readers can decompose a complex orthographic views to a set of simpler orthographic views that is easier to match a simple shape or generic object.

Examples

Guidance 1 : Examples

- The readers have a stock of a pair of an orthographic views and a simple shape object.



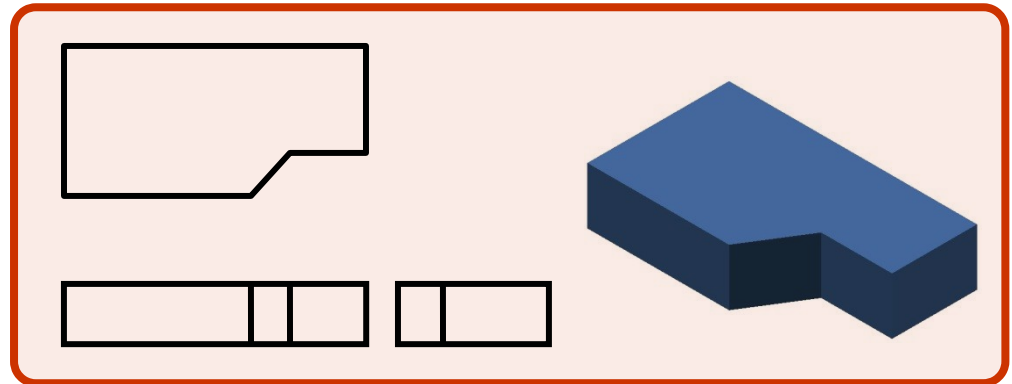
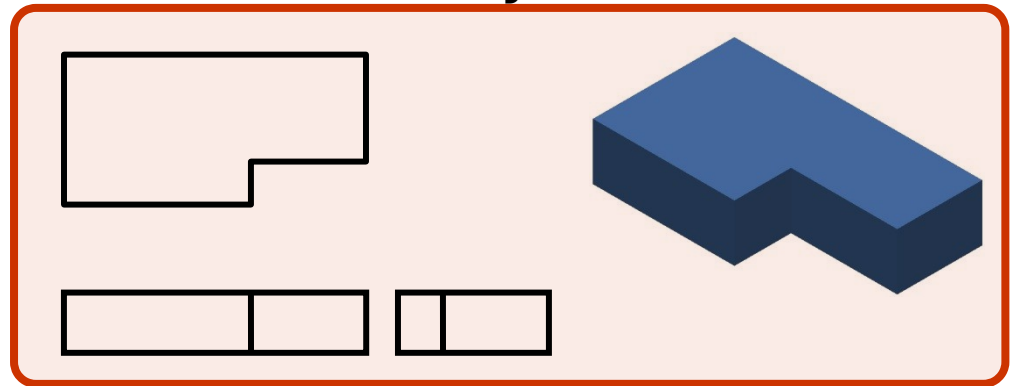
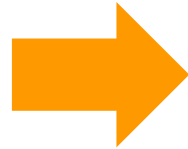
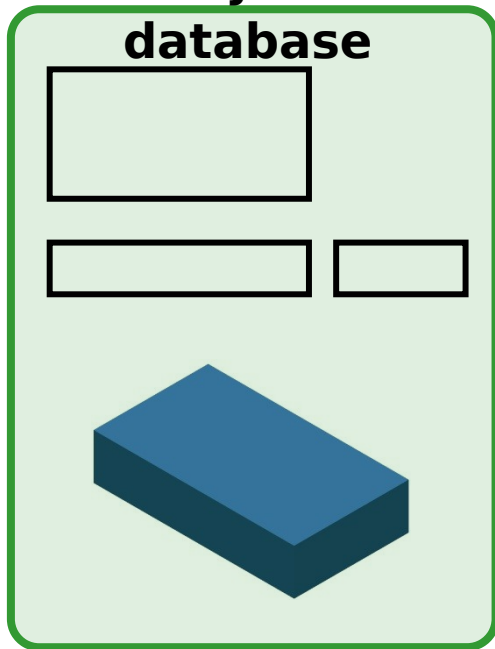
Guidance 2 : Examples

- The readers familiar with a generic object, i.e. an object that is

modified from a simple shape object.

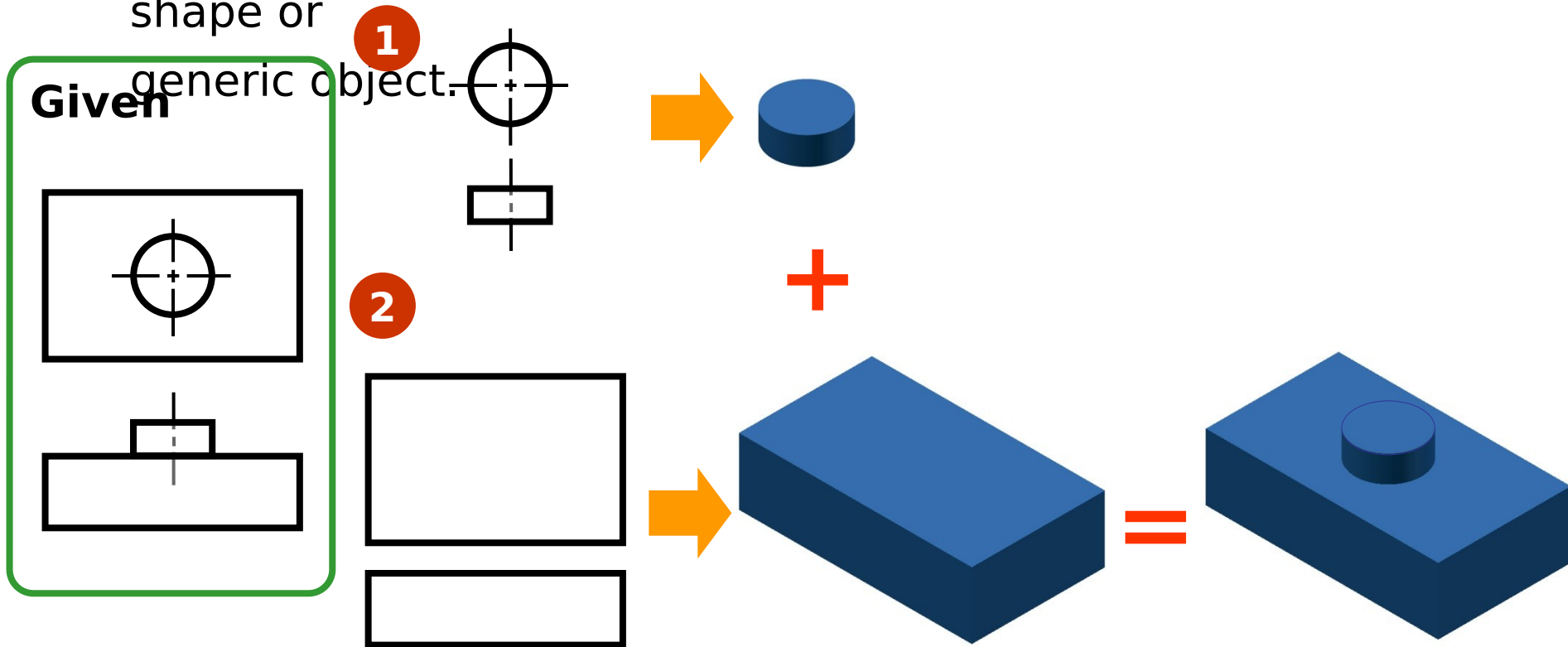
**Simple shape
object
database**

Generic object database



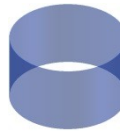
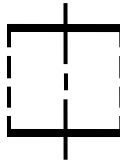
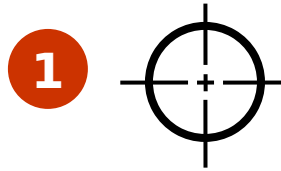
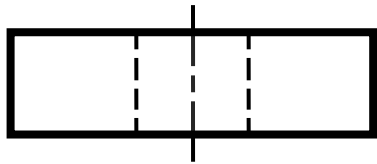
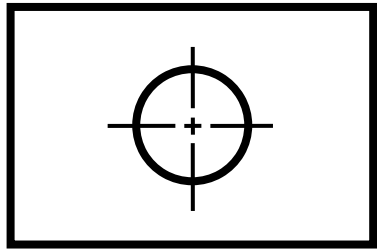
Guidance 3 : Examples

- The readers can **decompose a complex orthographic views** to a set of simpler orthographic views that is easier to match a simple shape or generic object.



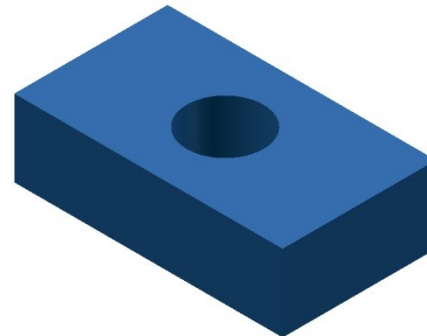
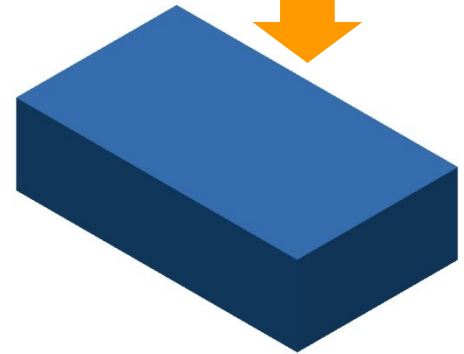
Example 1

Given



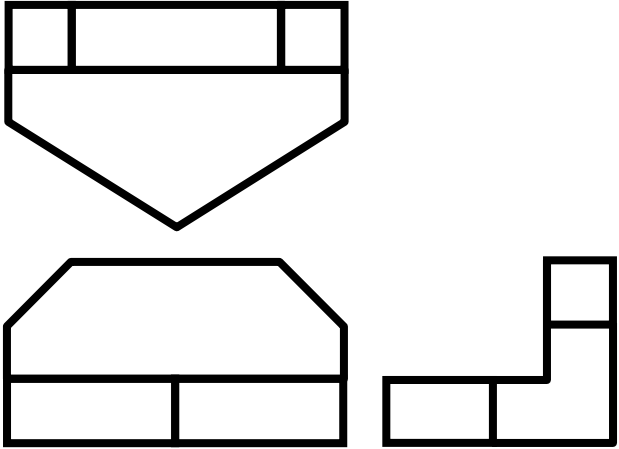
Negative cylinder (Hole)

2

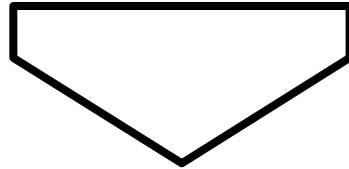


Example 2

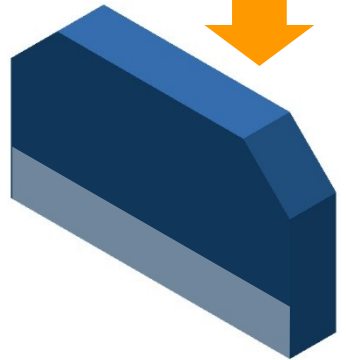
Given



1

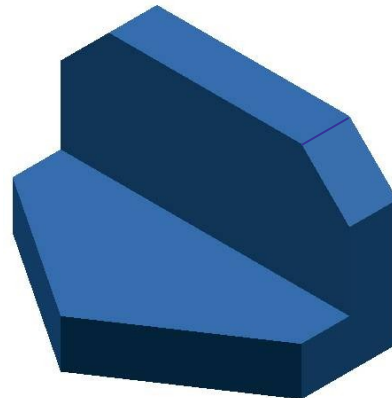


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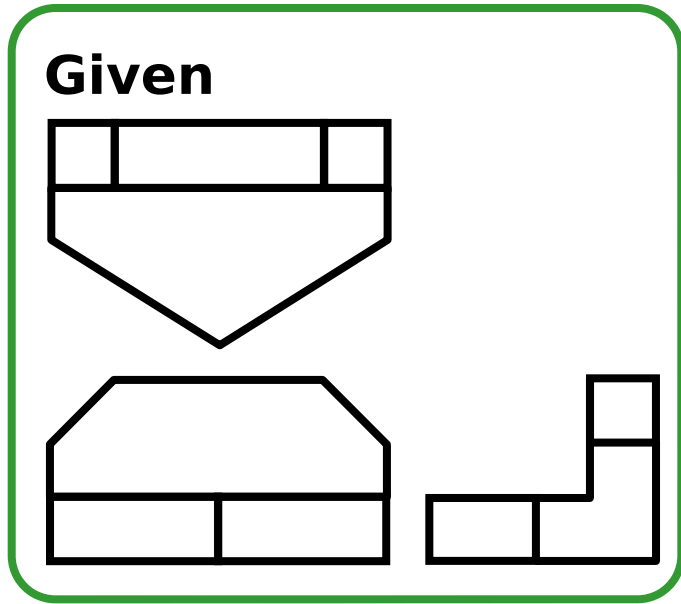


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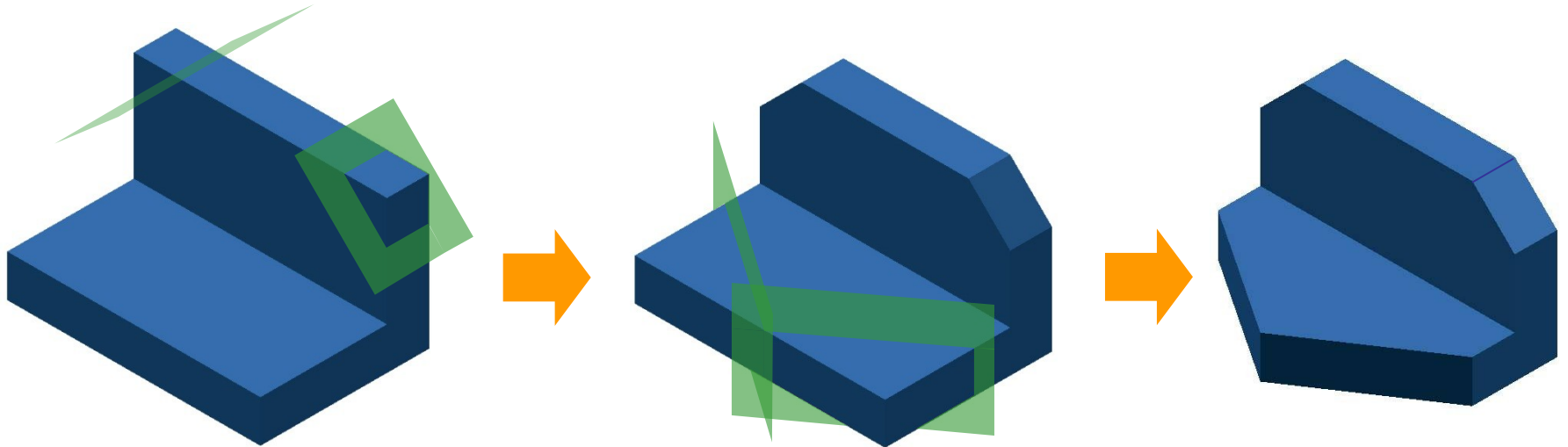
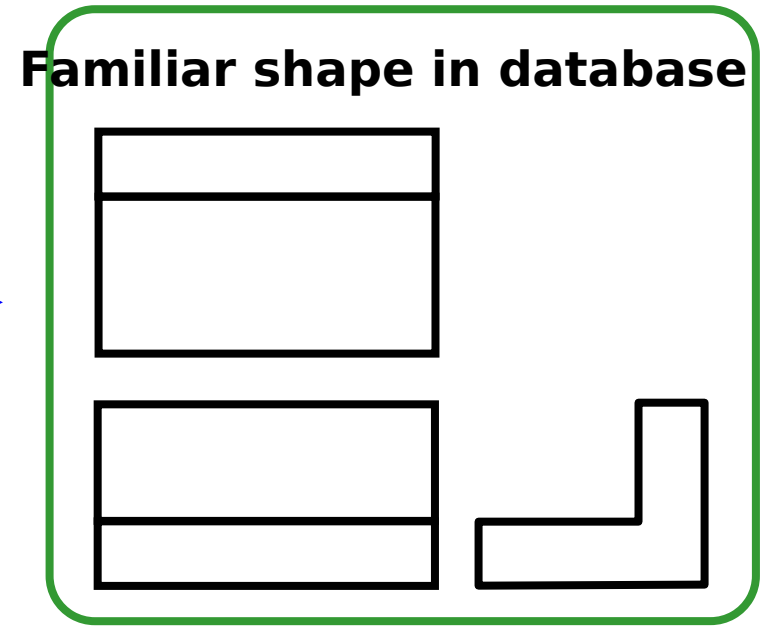
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Example 2 : Method 2

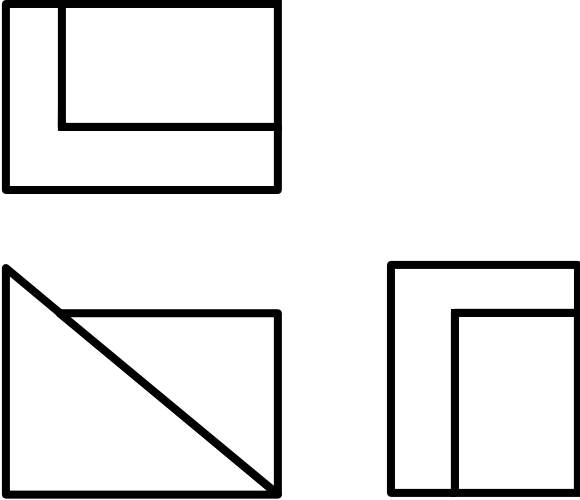


Recall →

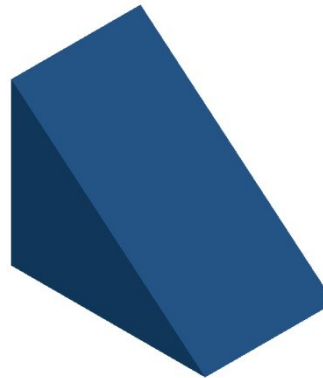
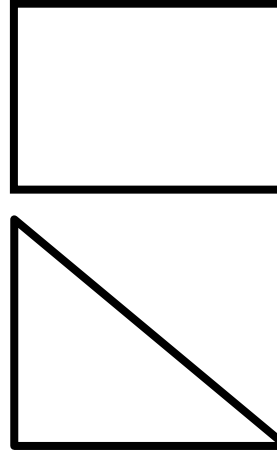


Example 3

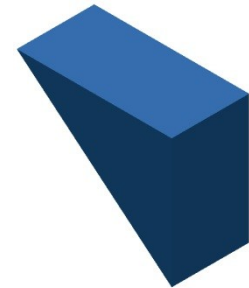
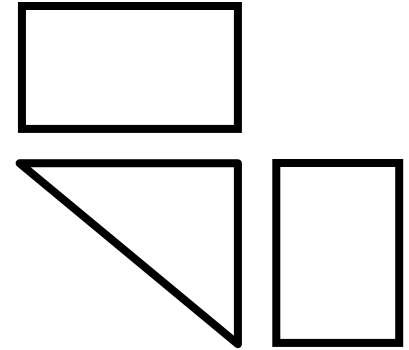
Given



1

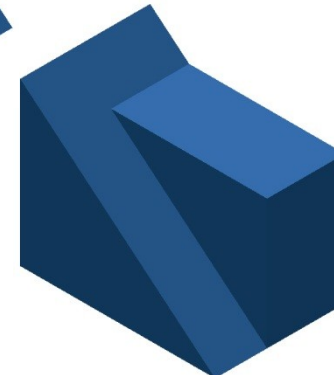


2



+

=

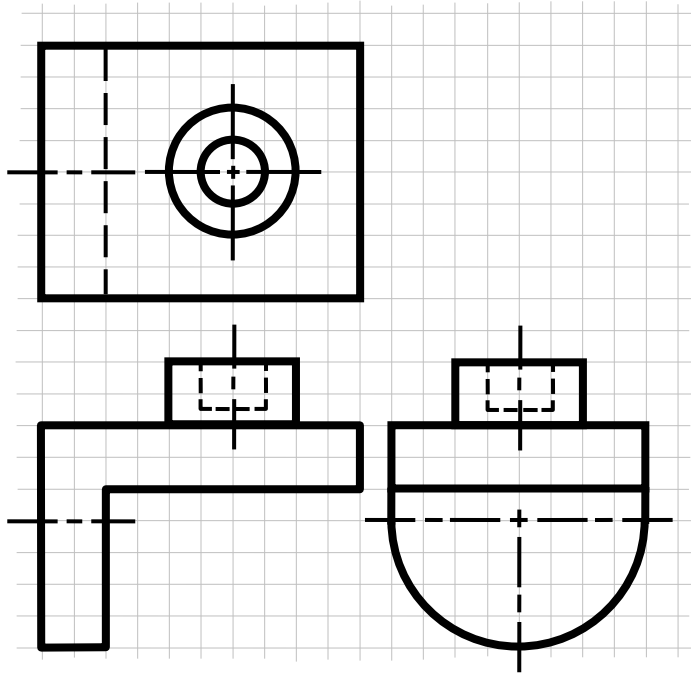


Note

This example shows the difficulty in decomposition of the areas in orthographic views, i.e. a limitation of this method.

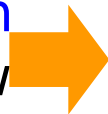
Class activity : Analysis by solids

Given



1. **Decompose** the given orthographic views

2. **Roughly sketch**
a pictorial view
of this object





Visualization techniques :

Analysis by surfaces

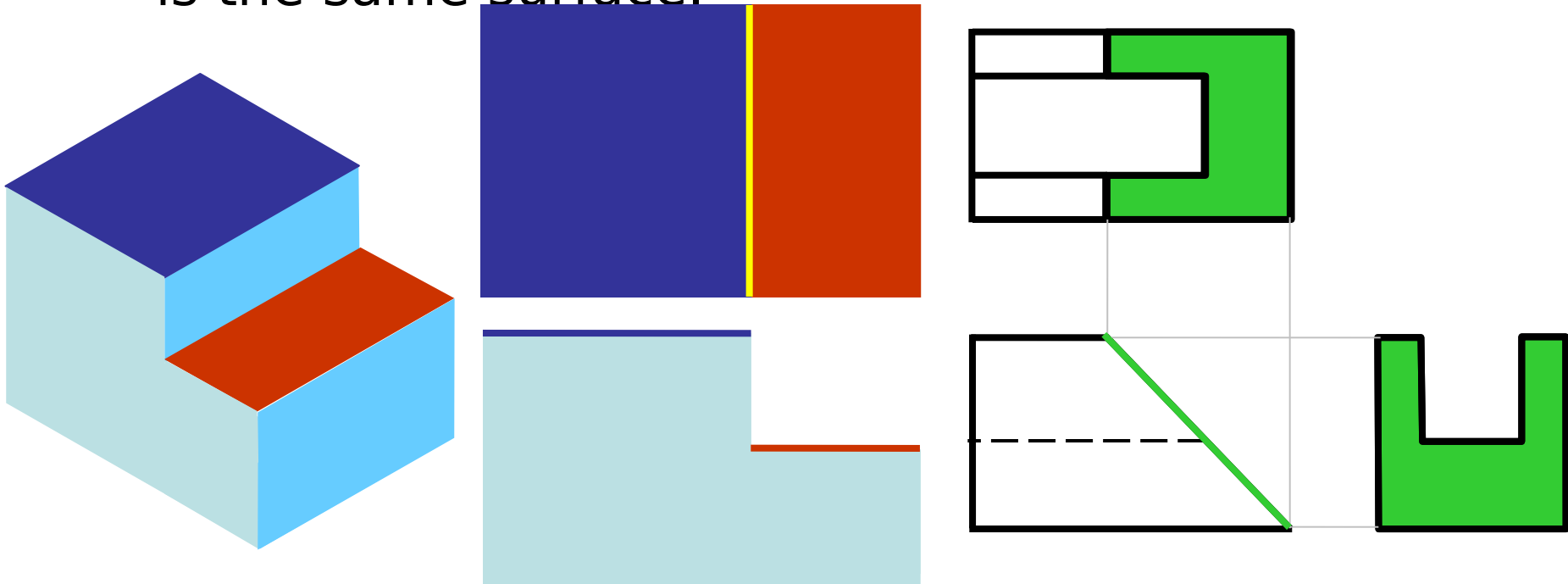
Techniques

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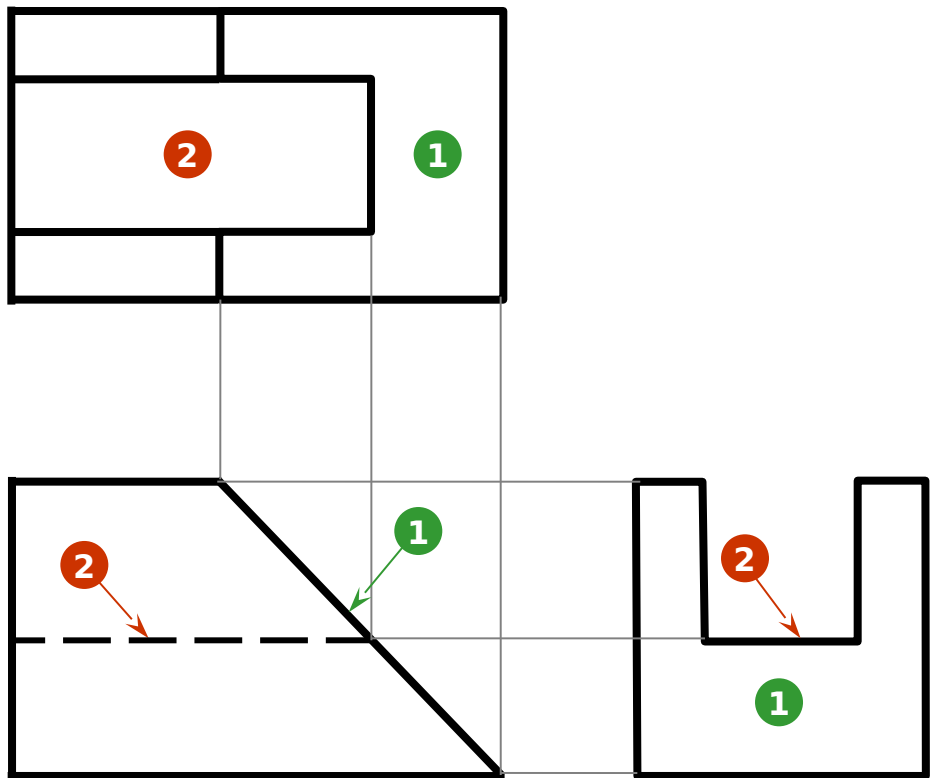
Guidance

1. Adjacent areas that are not lie in the same plane are
2. Separated by lines similar shape in more than one view

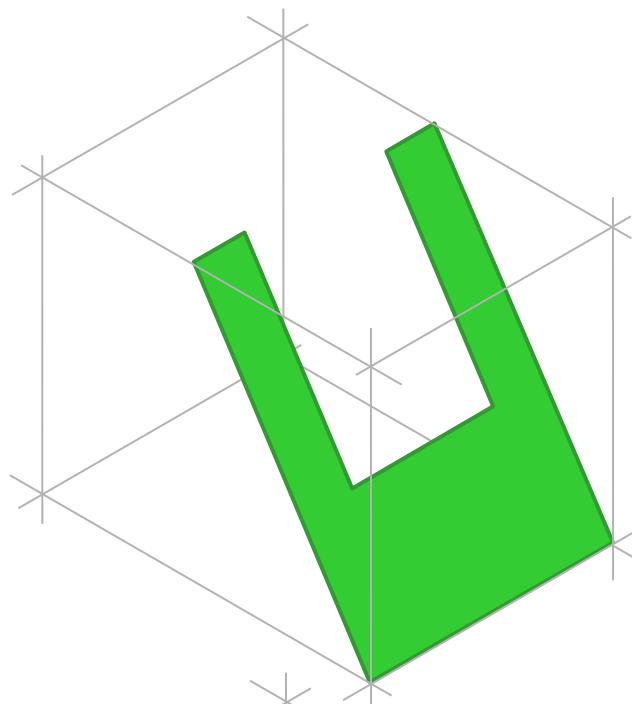
is the same surface.



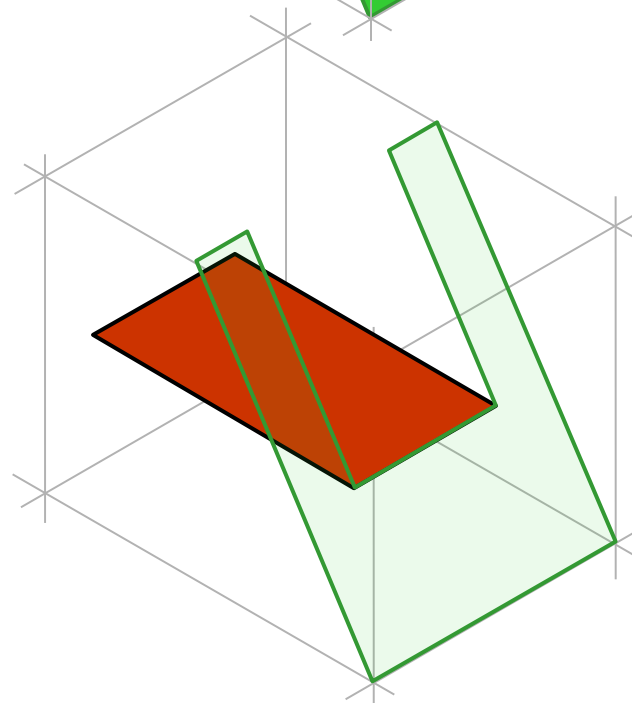
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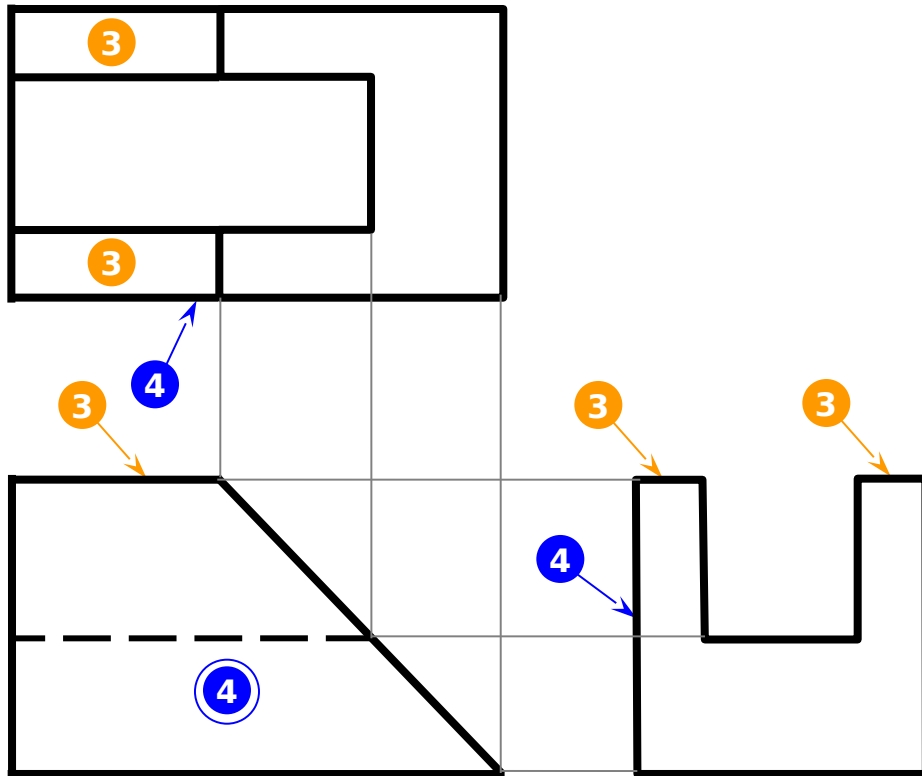
1



2

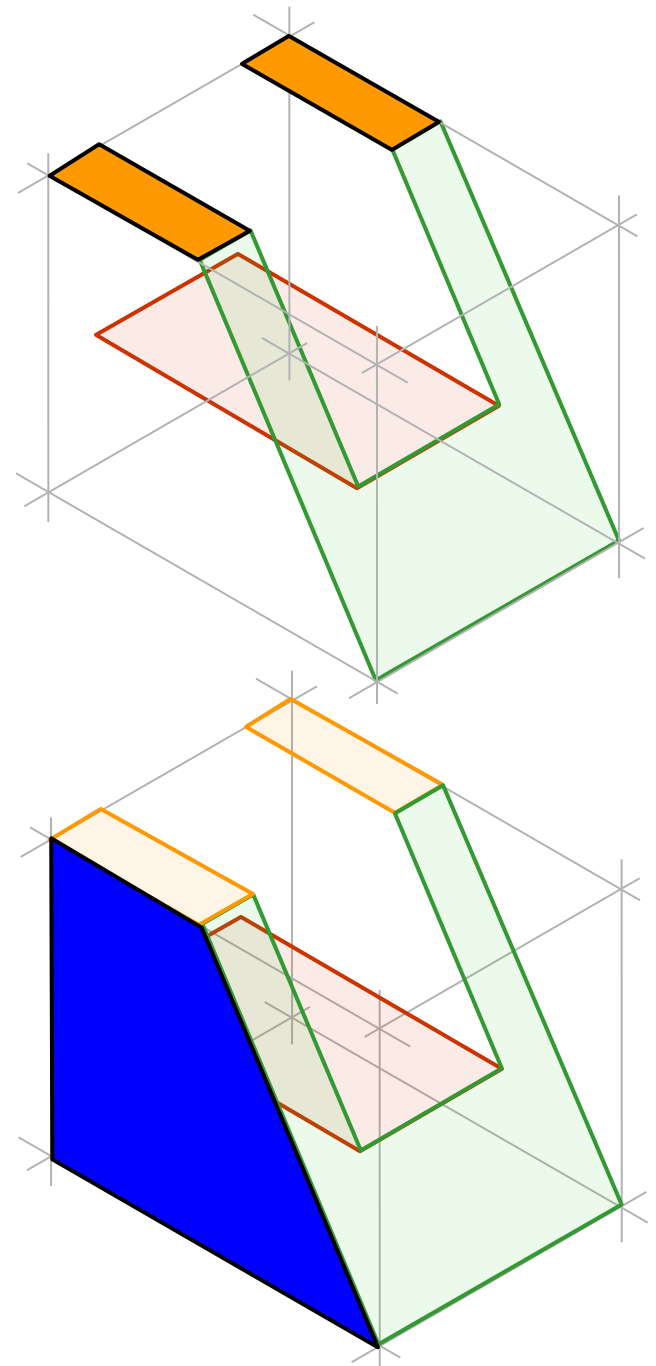


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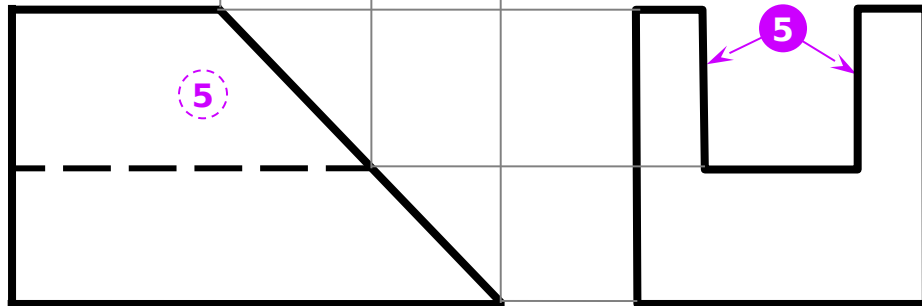
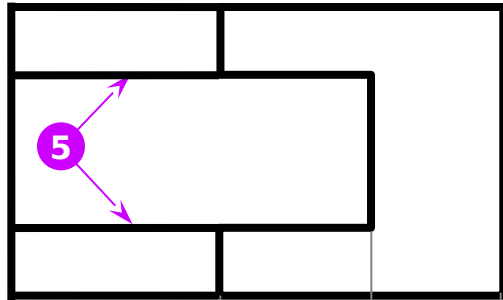


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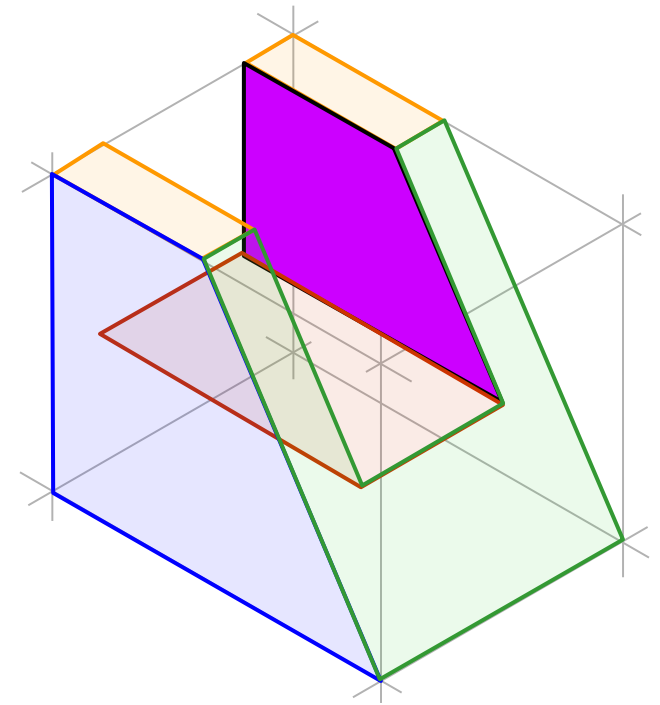
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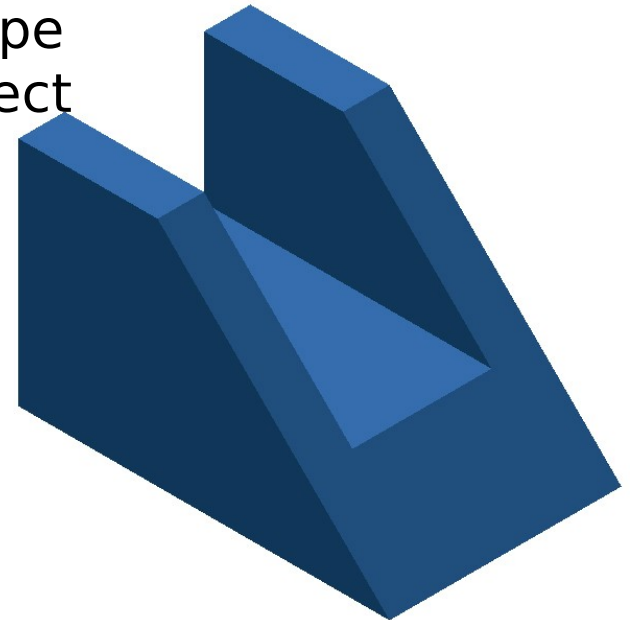
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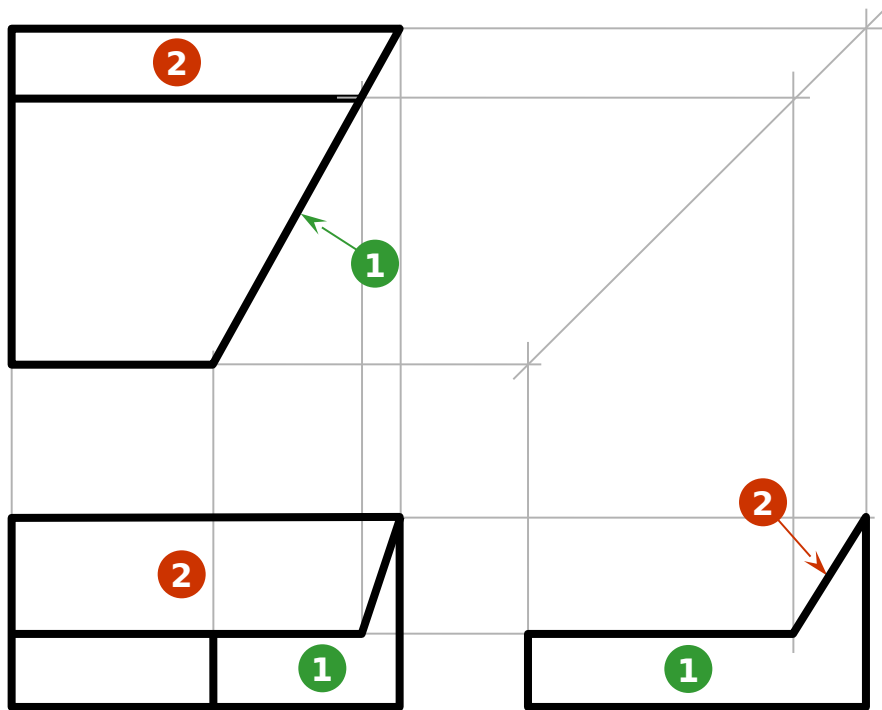
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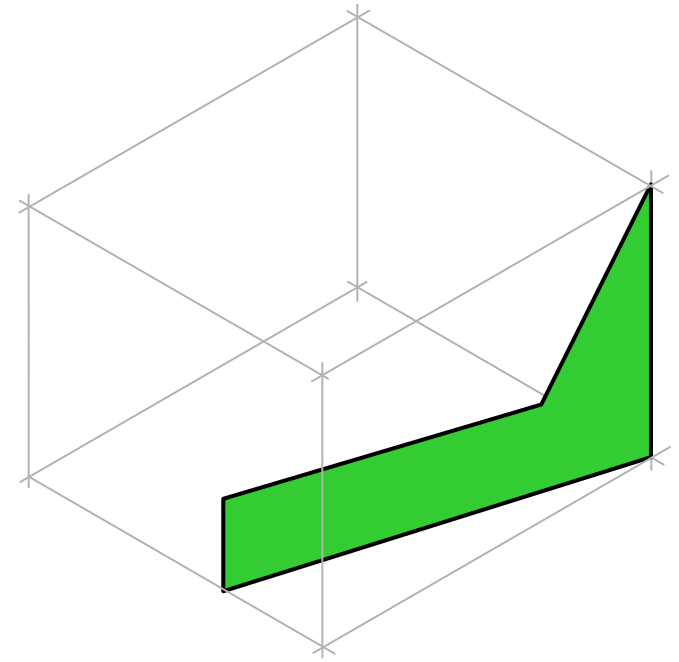
Final shape
of an object



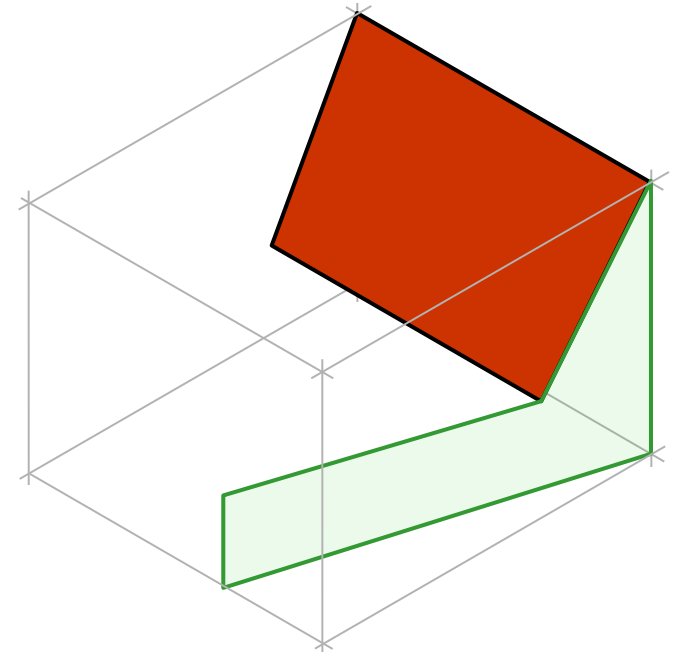
Example 2 (1/3)



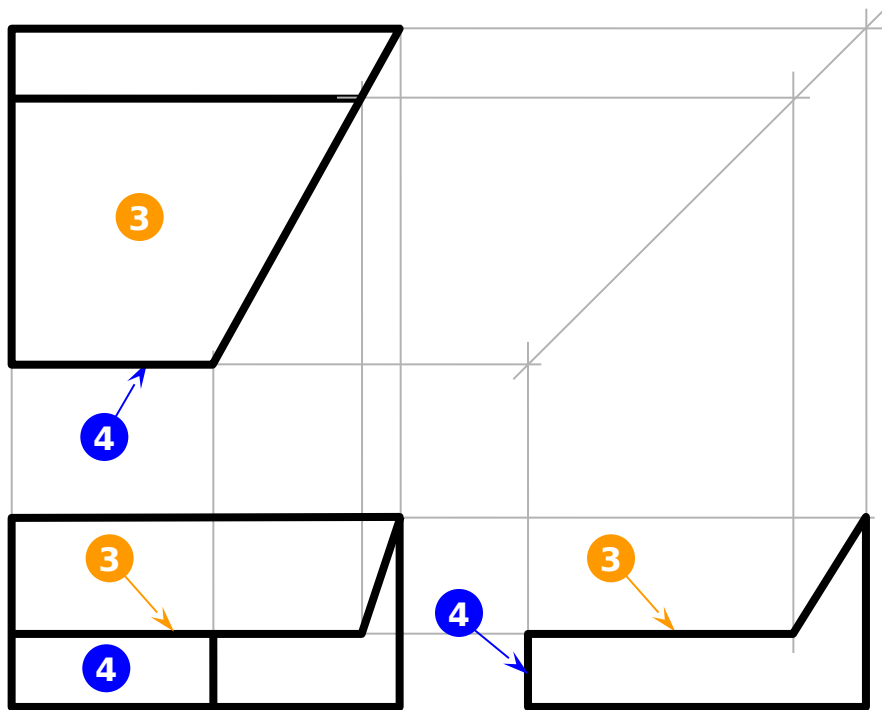
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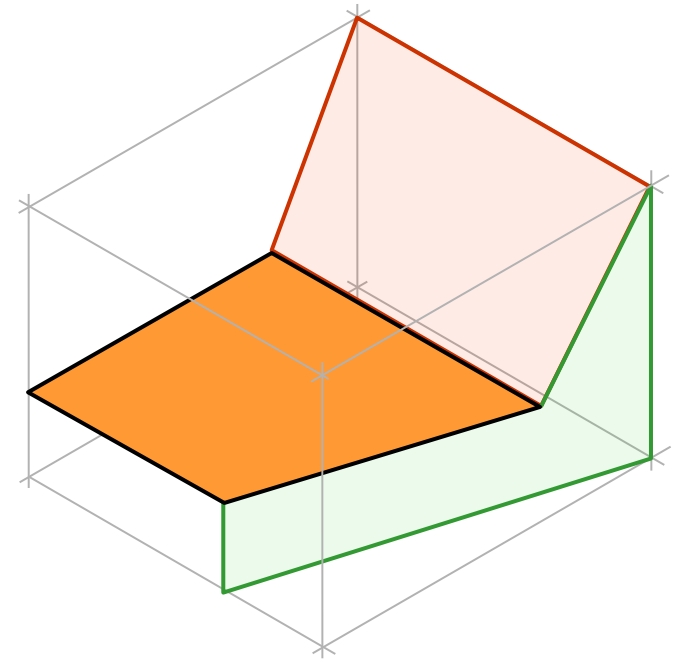
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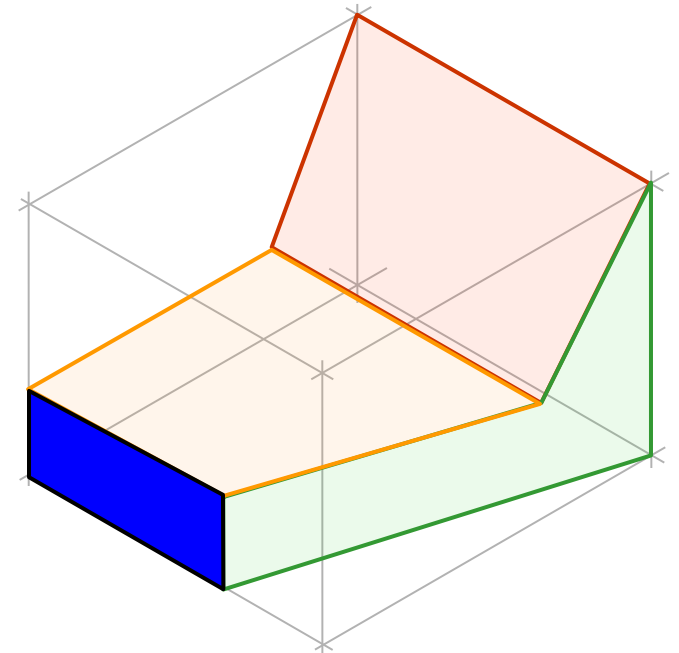
Example 2 (2/3)



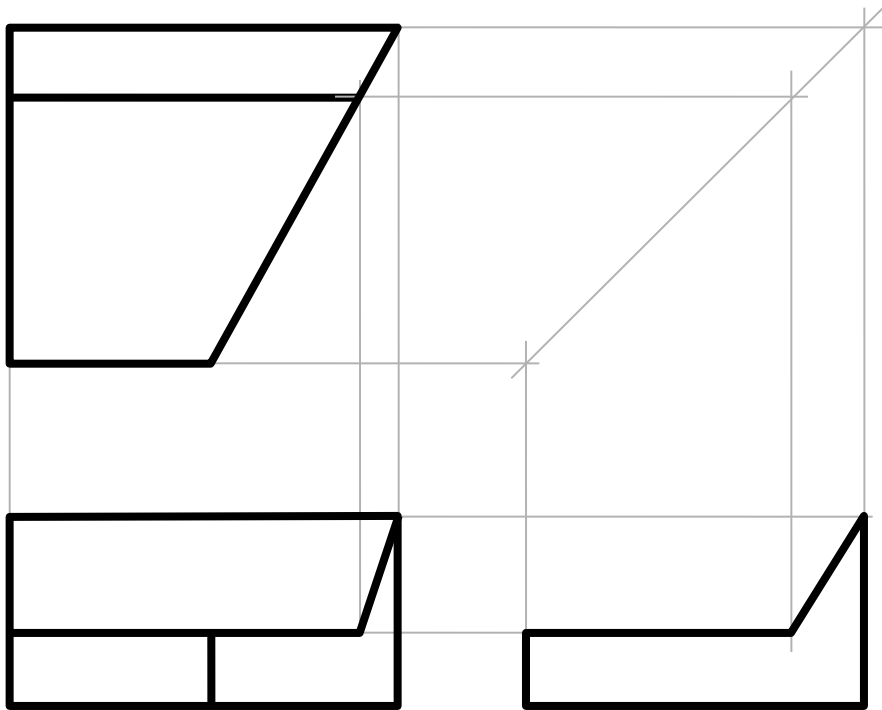
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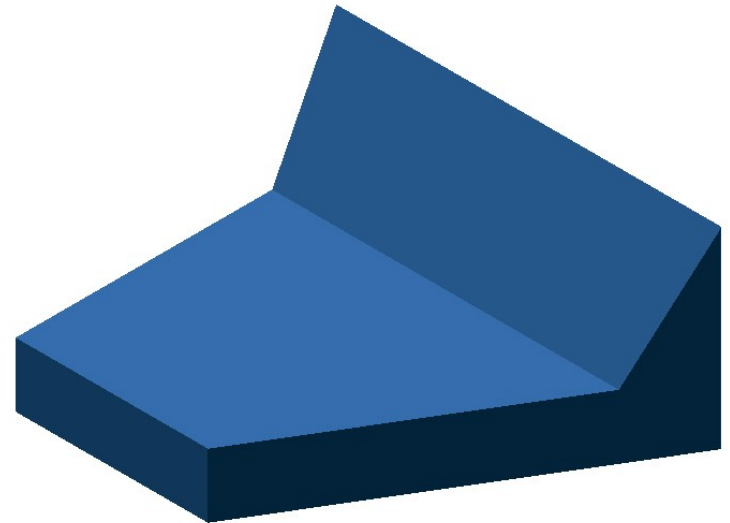
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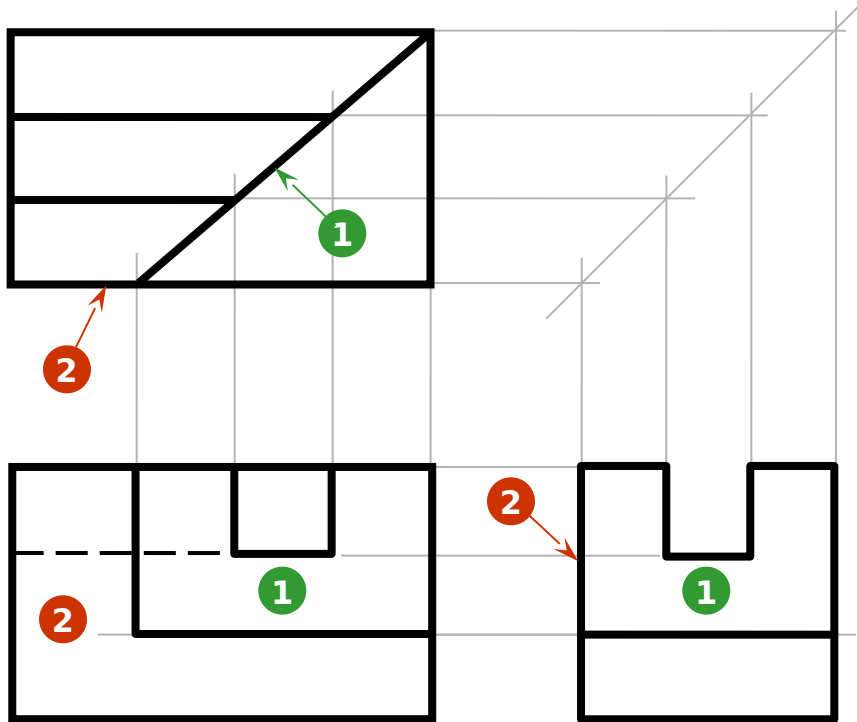
Example 2 (3/3)



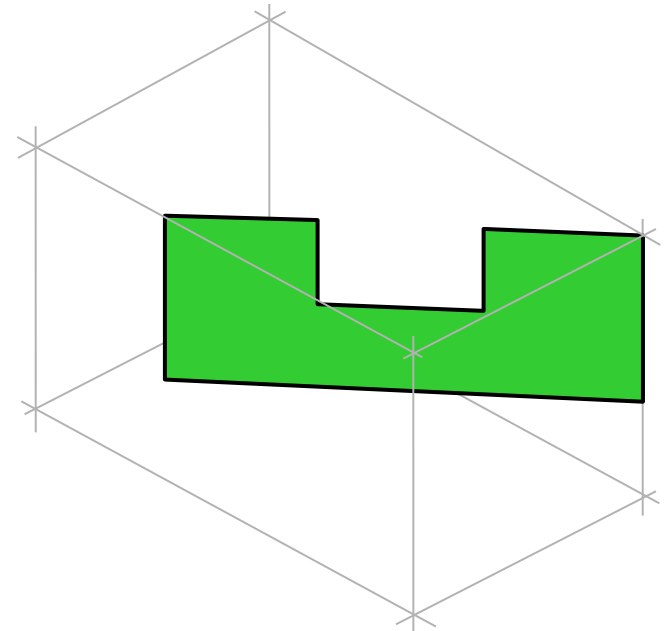
Final shape
of an object



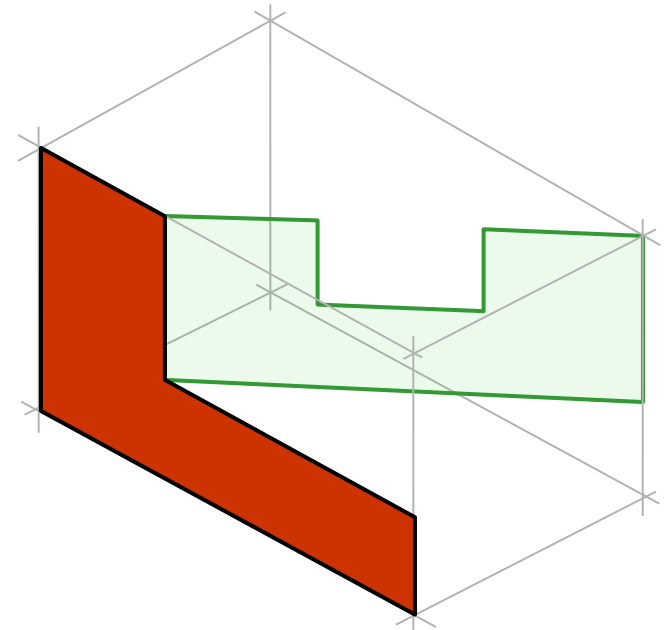
Example 3 (1/4)



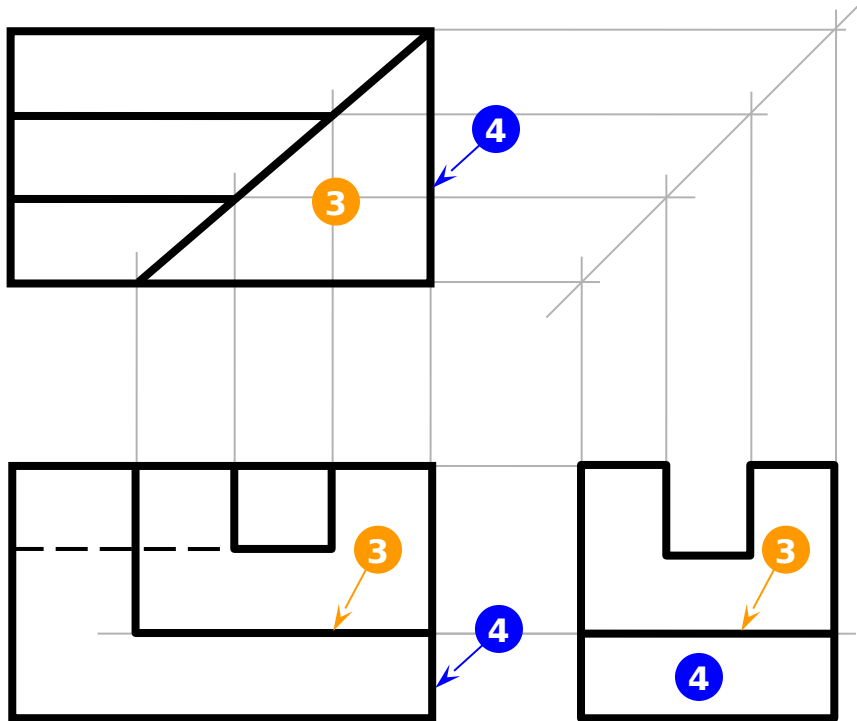
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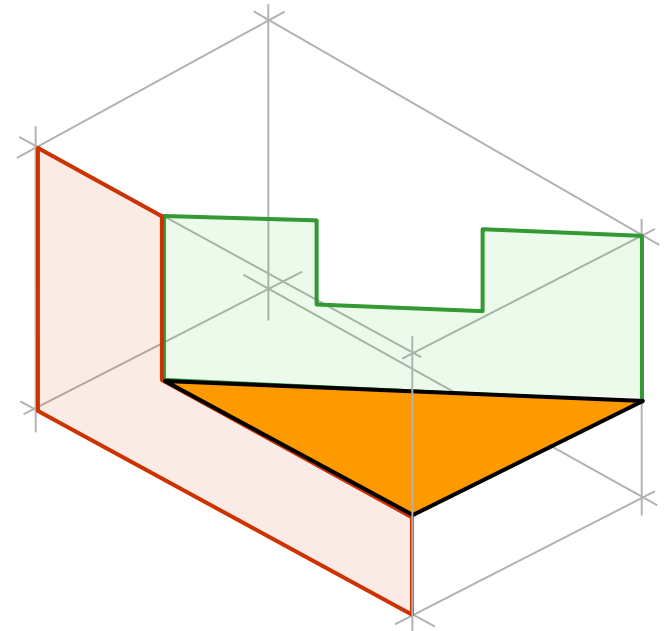
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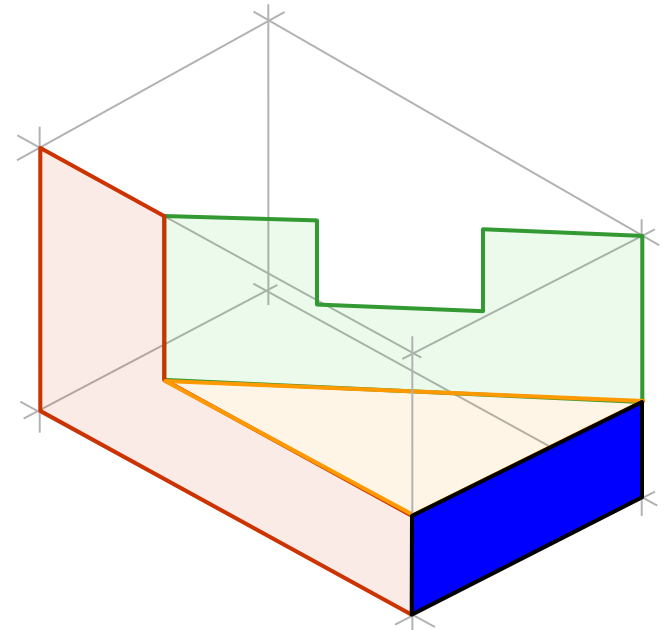
Example 3 (2/4)



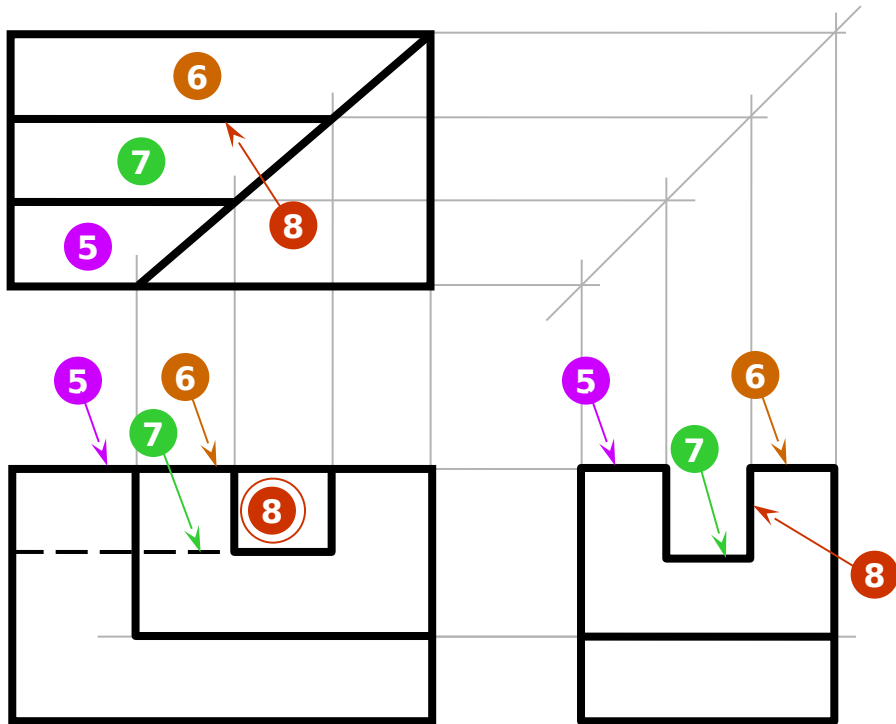
3



4

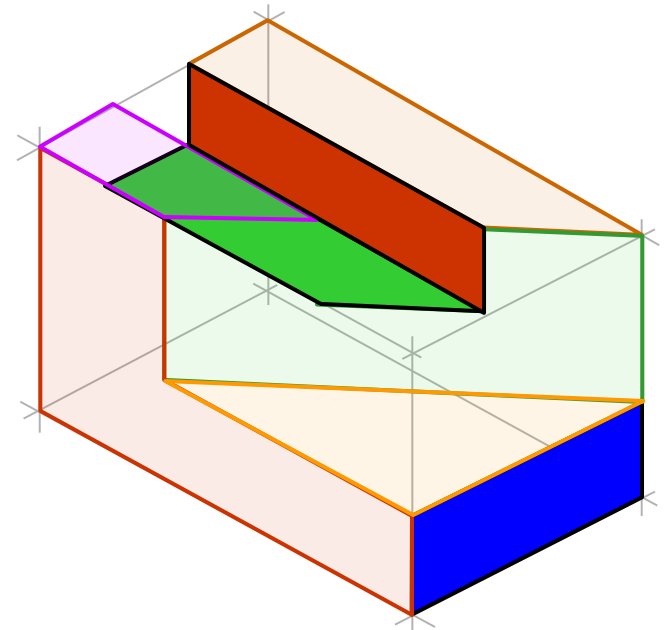
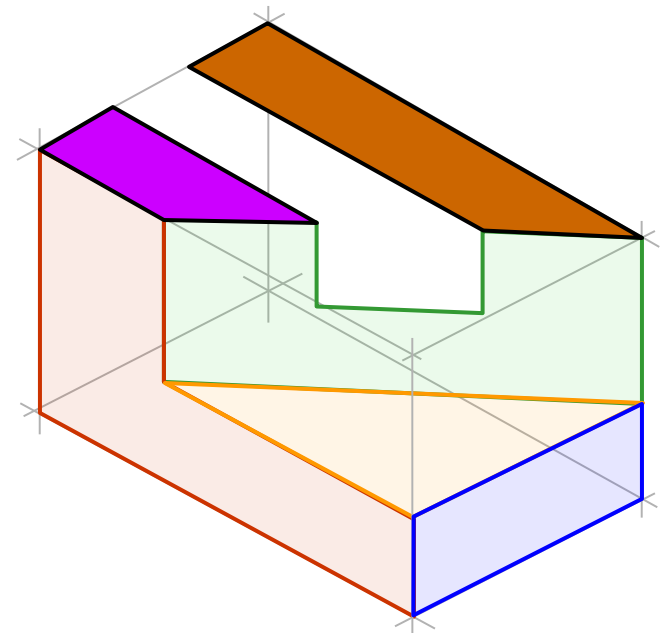


Example 3 (3/4)

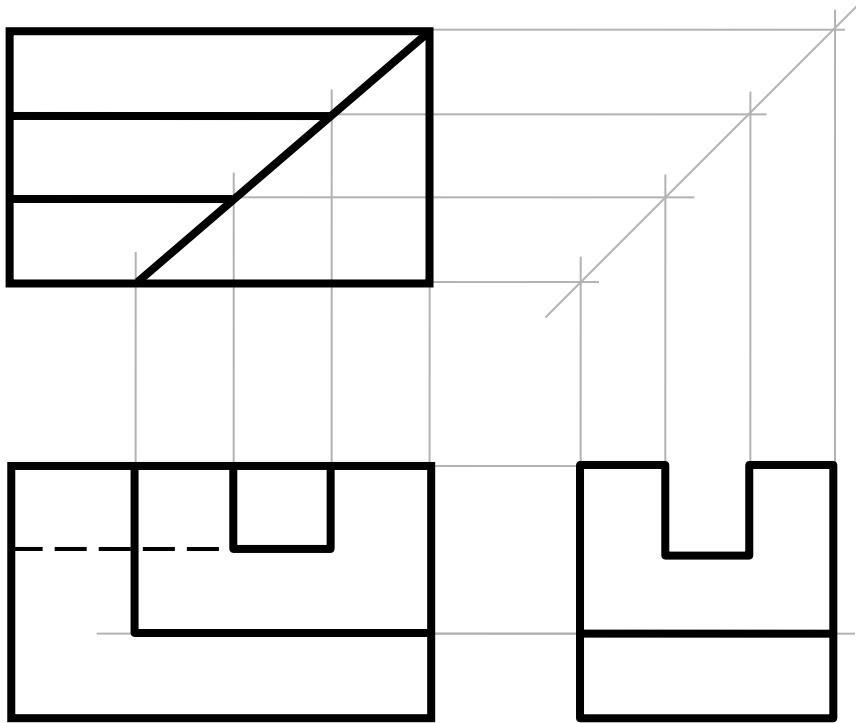


5
6

7
8



Example 3 (4/4)



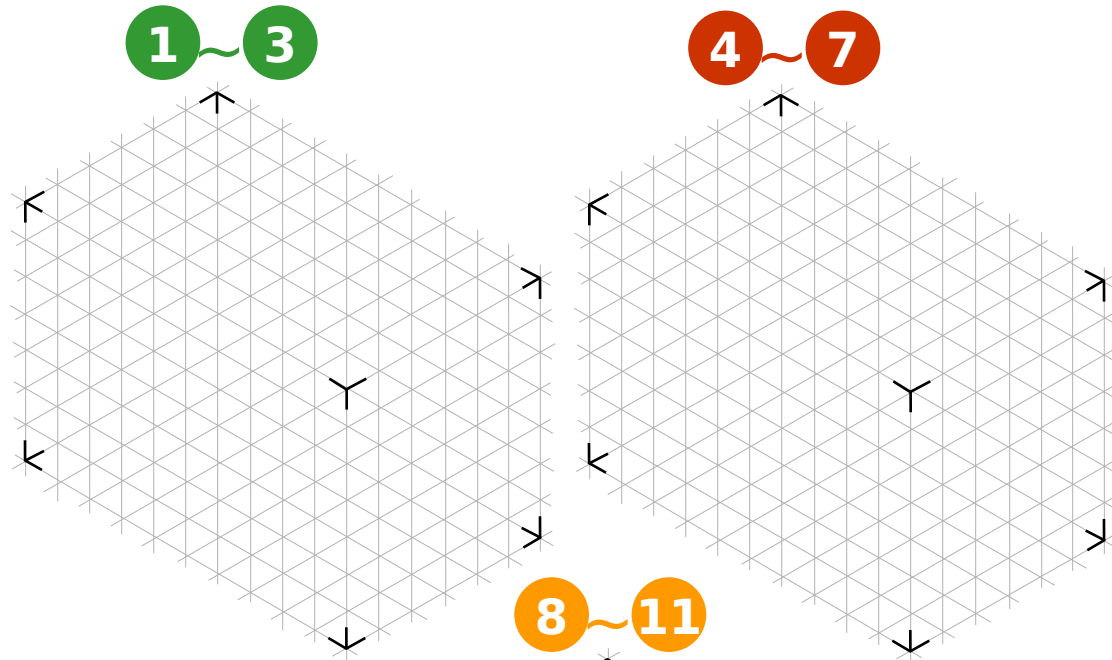
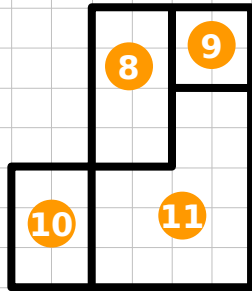
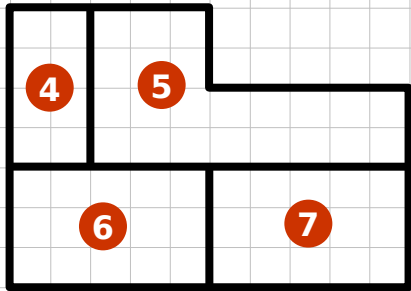
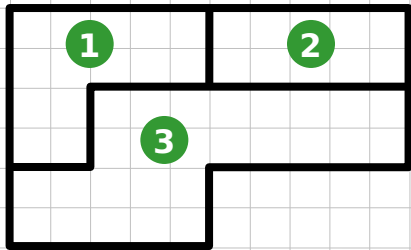
Final shape
of an object



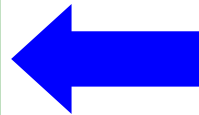
Class activity : Analysis by surfaces

10 min

Given

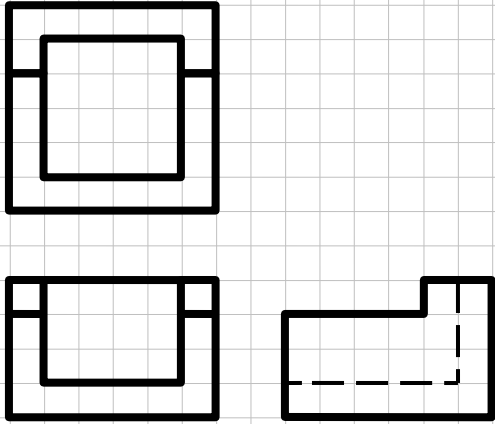


Roughly sketch of the object

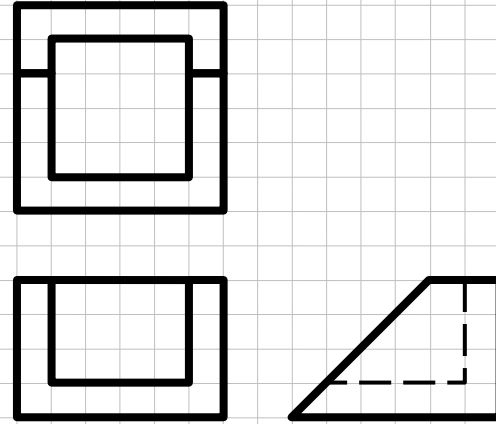


Self practice

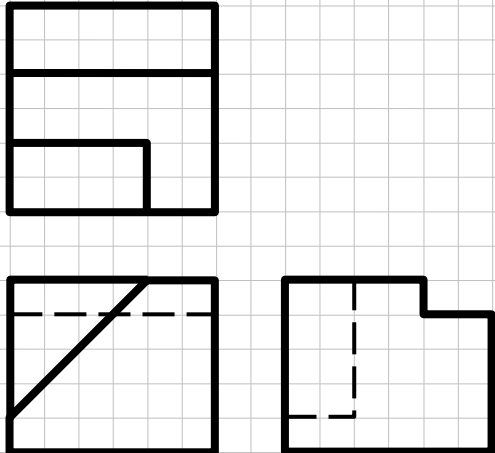
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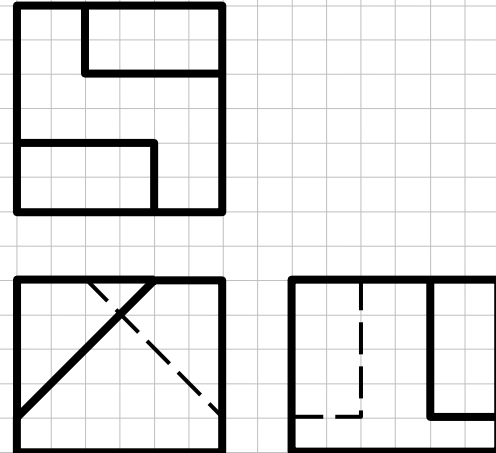
2



3



4





Higher level of visualization problem:

A missing view problem

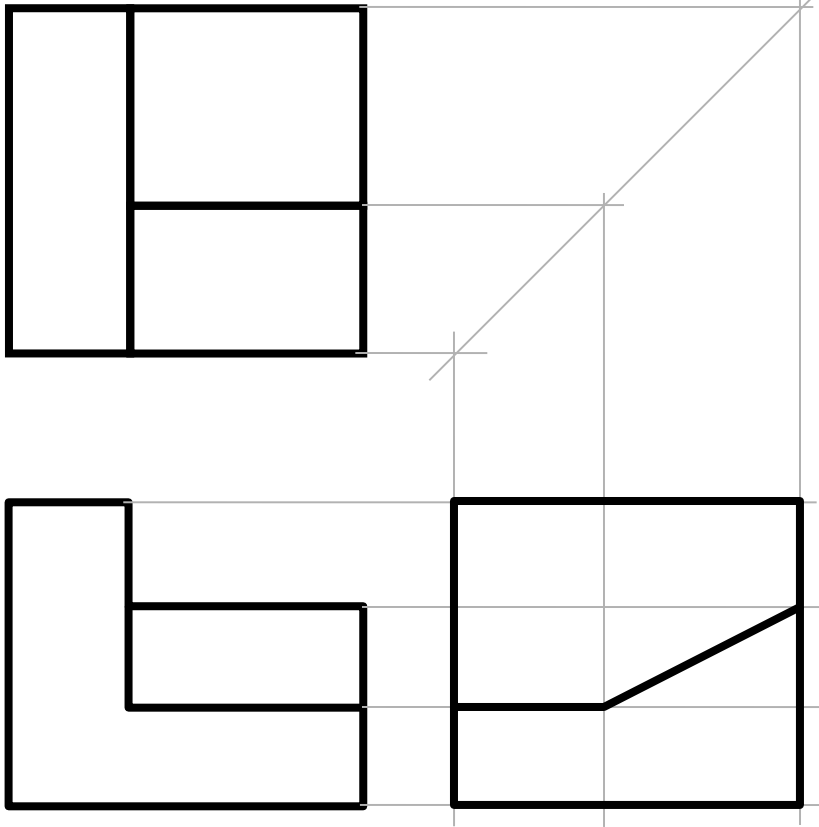
Techniques

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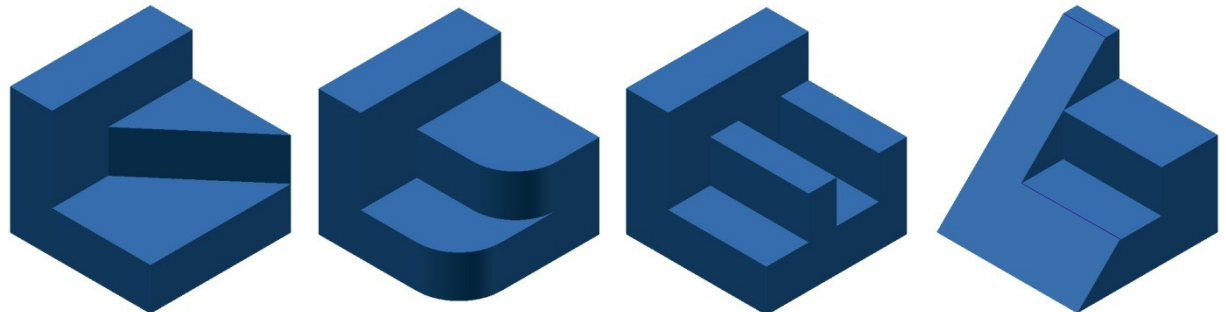
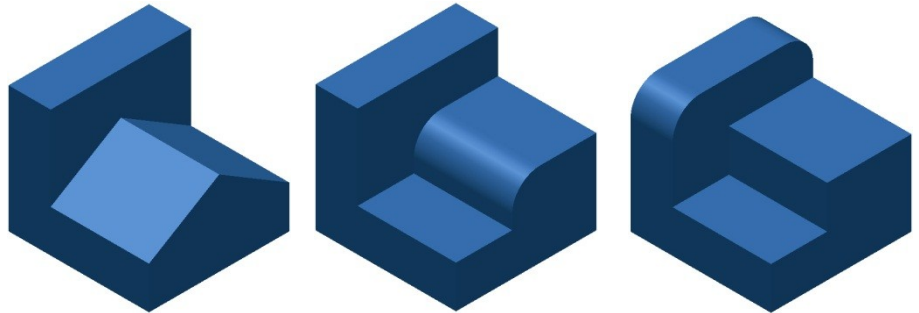
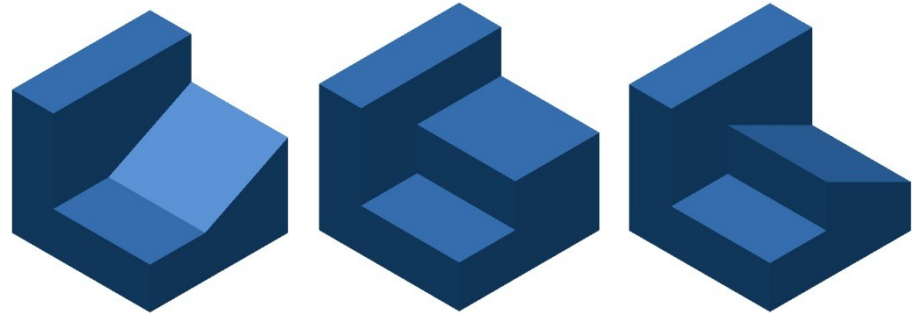
Notes

1. For a given three (**independent**) orthographic views of an object, there is a **unique** object that is satisfied with a given information.
2. The **lesser** of a given number of orthographic views, the **higher** in a number of possible objects will be.

Example : No. of views vs. Possible objects



Possible objects

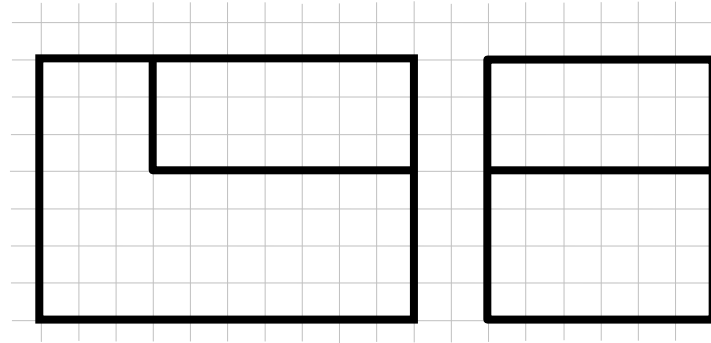


Class activity : Challenge your creativity

9
min

Given **two** views of an orthographic drawing, try to sketch a few of the possible shape objects.

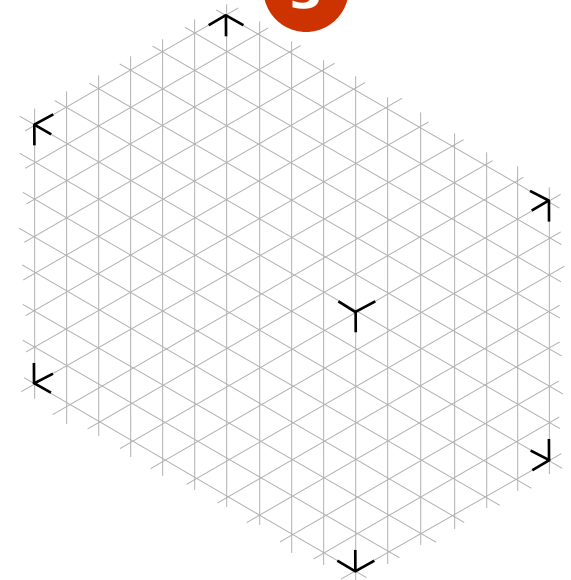
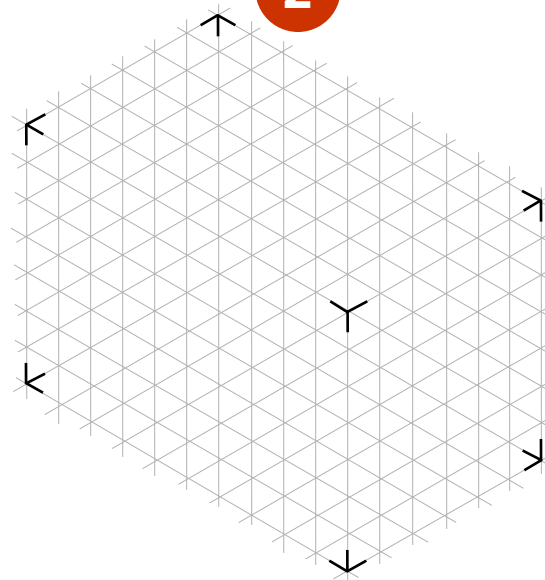
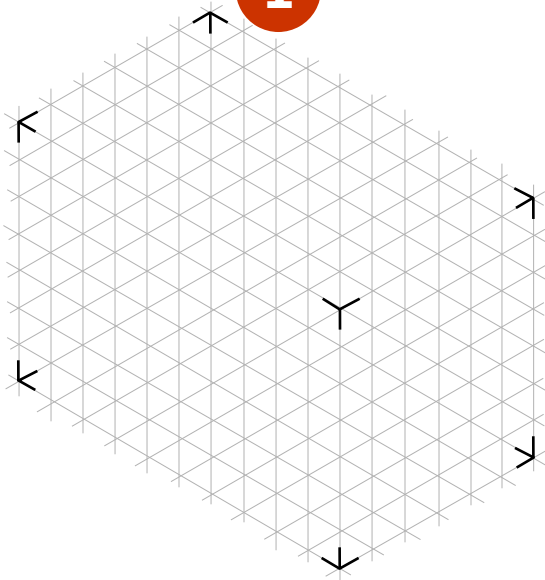
Given



1

2

3



Missing view problems : solution steps

Procedures

1. Analyze the alignment of a given orthographic views and

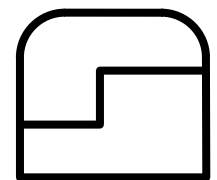
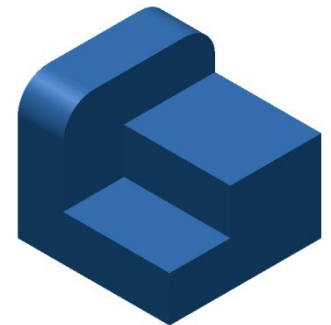
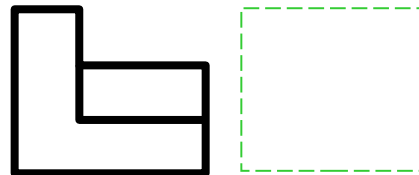
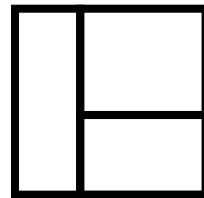
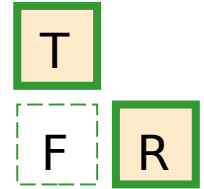
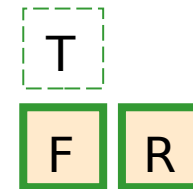
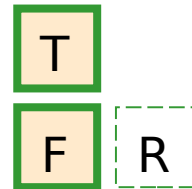
a missing view.

2. **Incrementally** and **iteratively** sketch a pictorial view of a

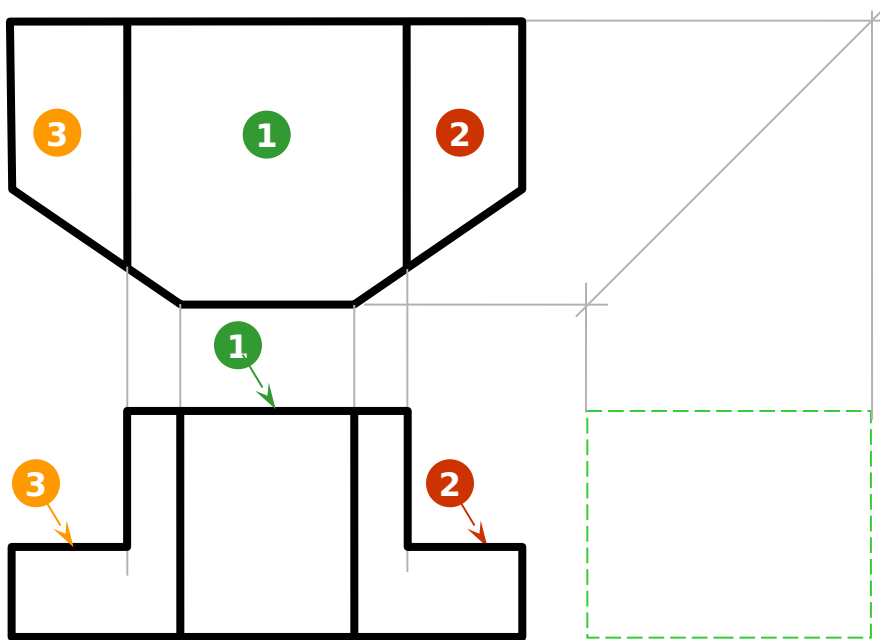
possible object.

3. Sketch the missing (or a required) view from a possible object

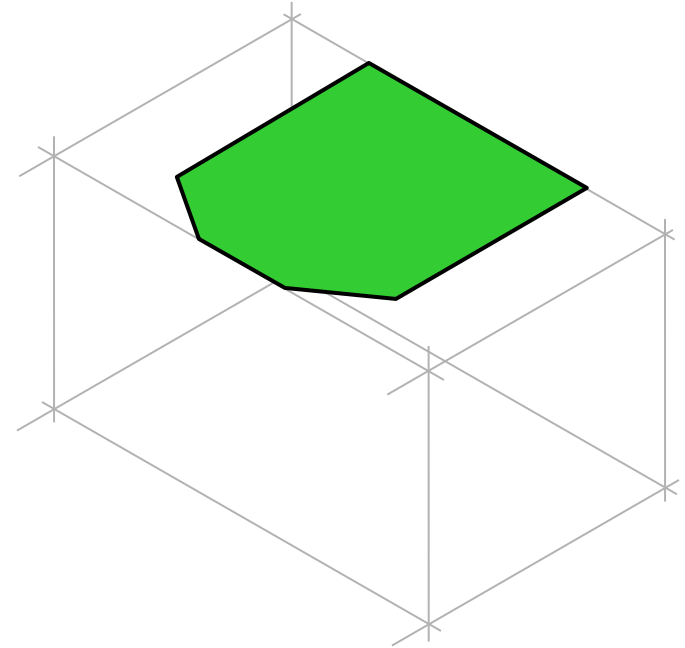
Examples



Example 1 : (1/3)

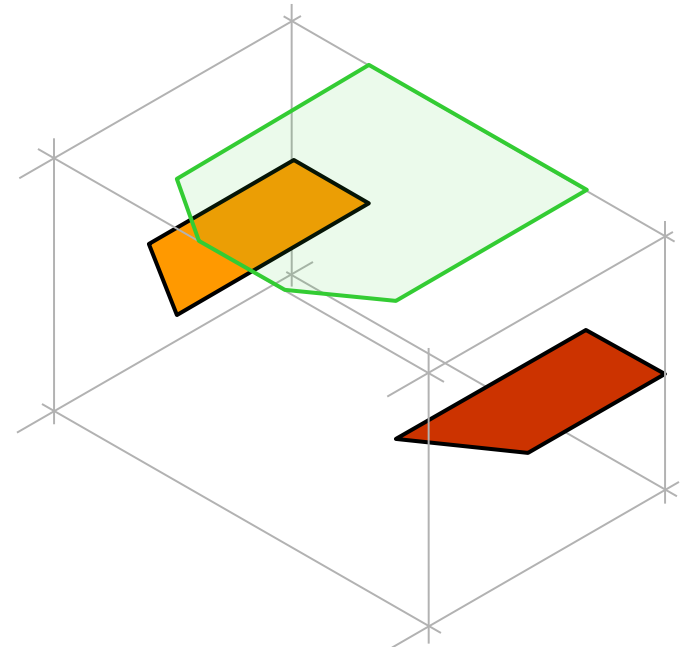


1

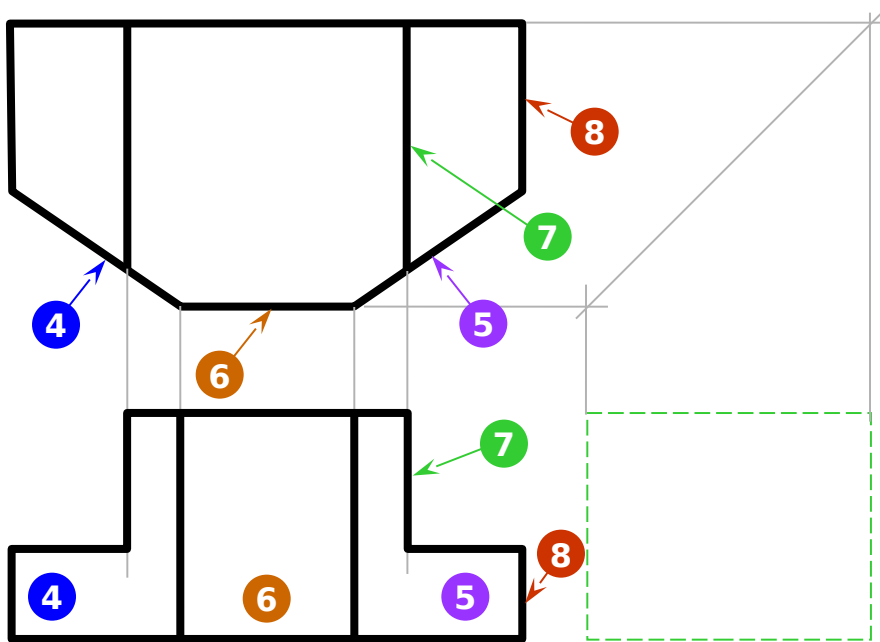


2

3



Example 1 : (2/3)



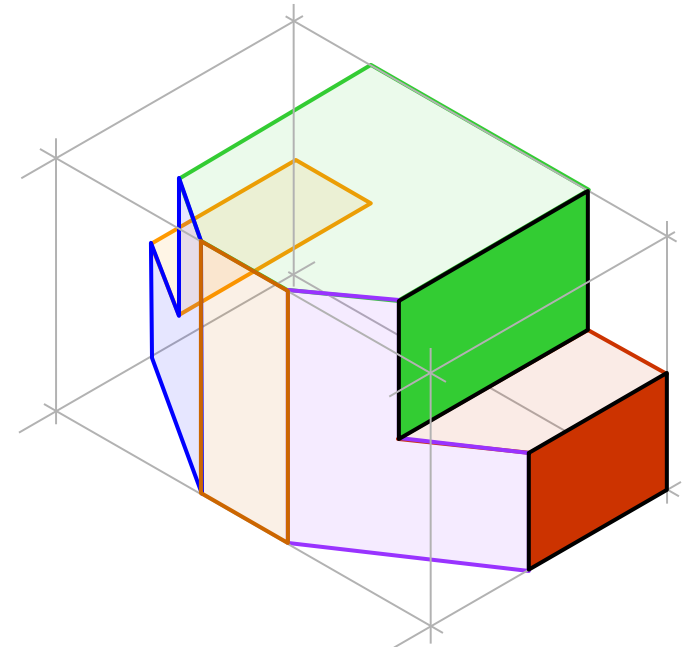
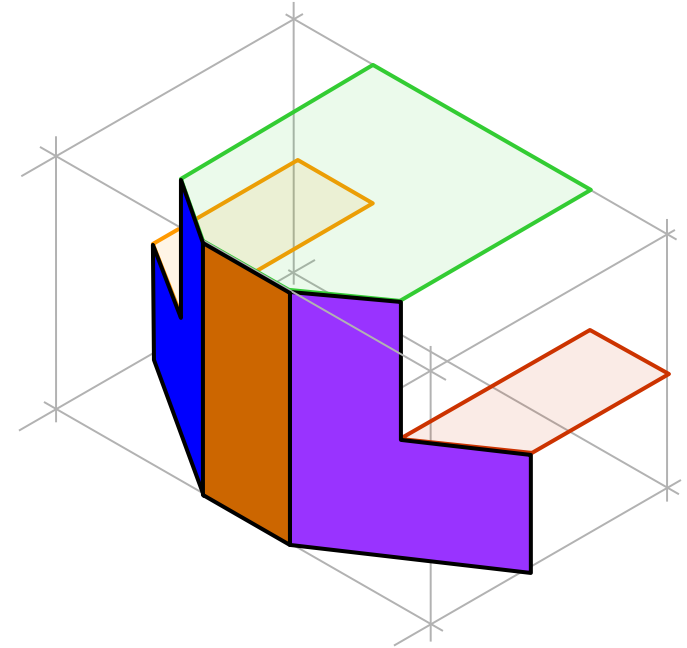
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5

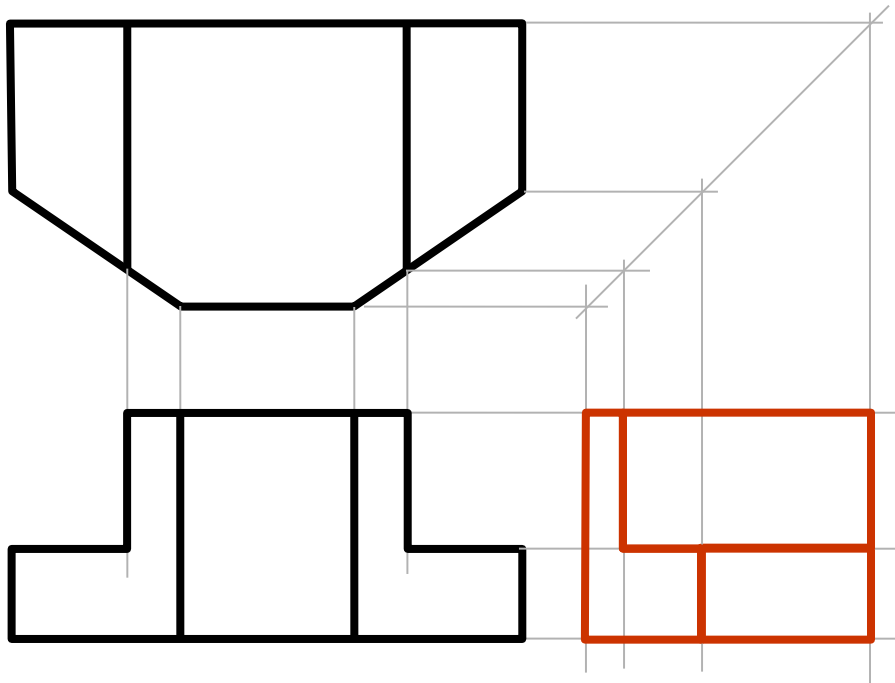
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7

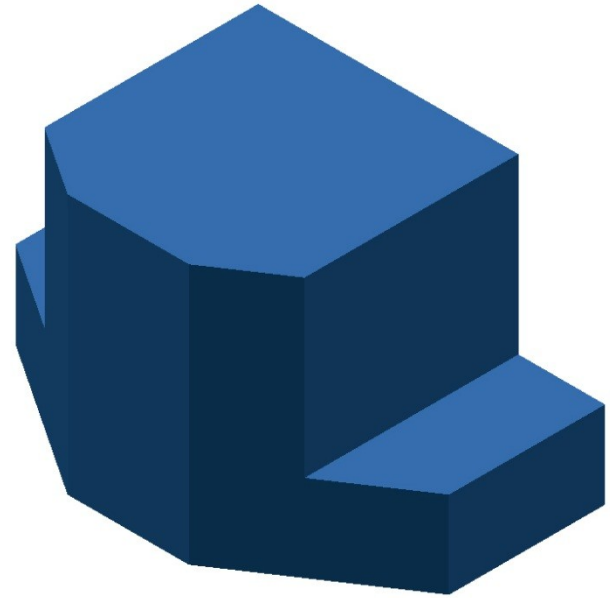
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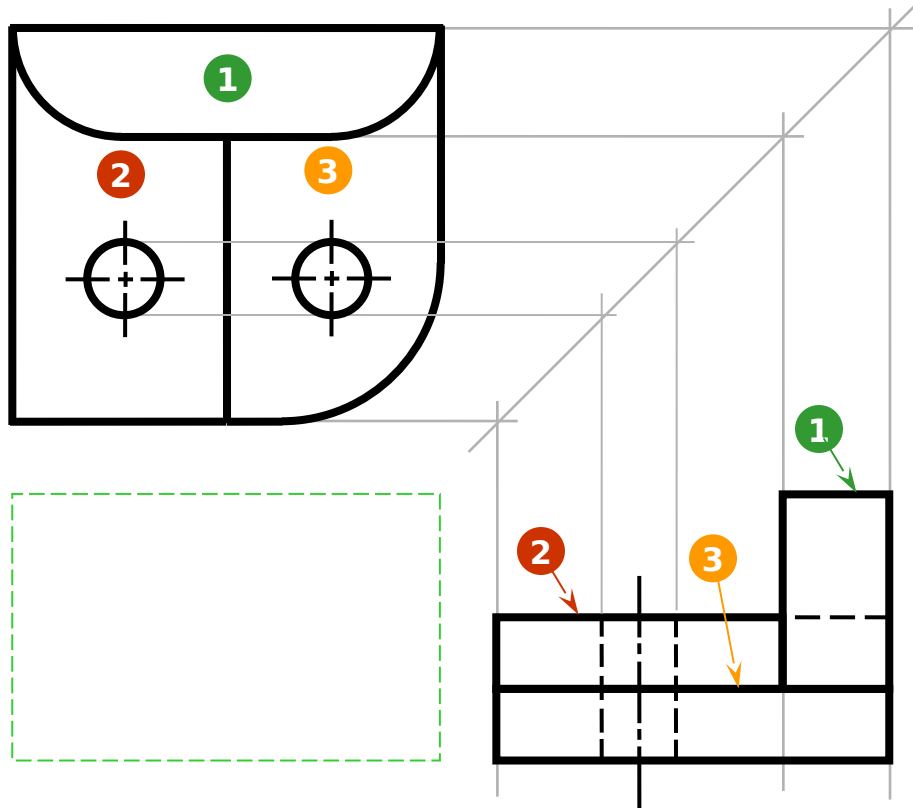
Example 1 : (3/3)



Final shape
of an object



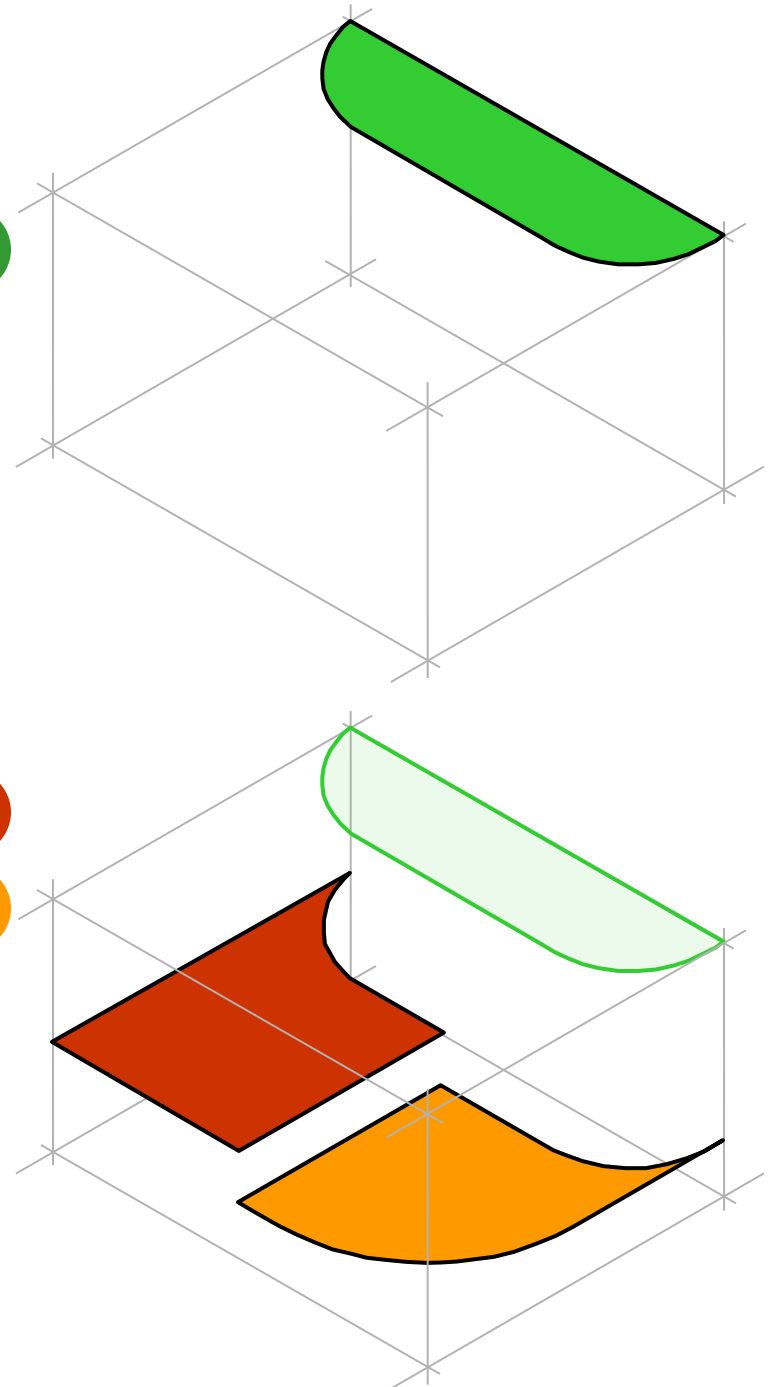
Example 2 : (1/3)



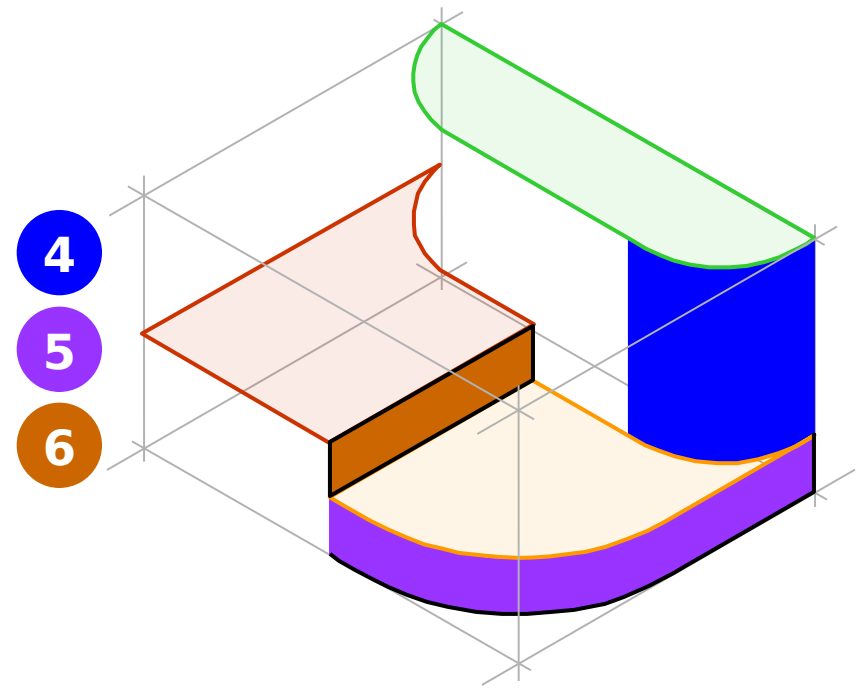
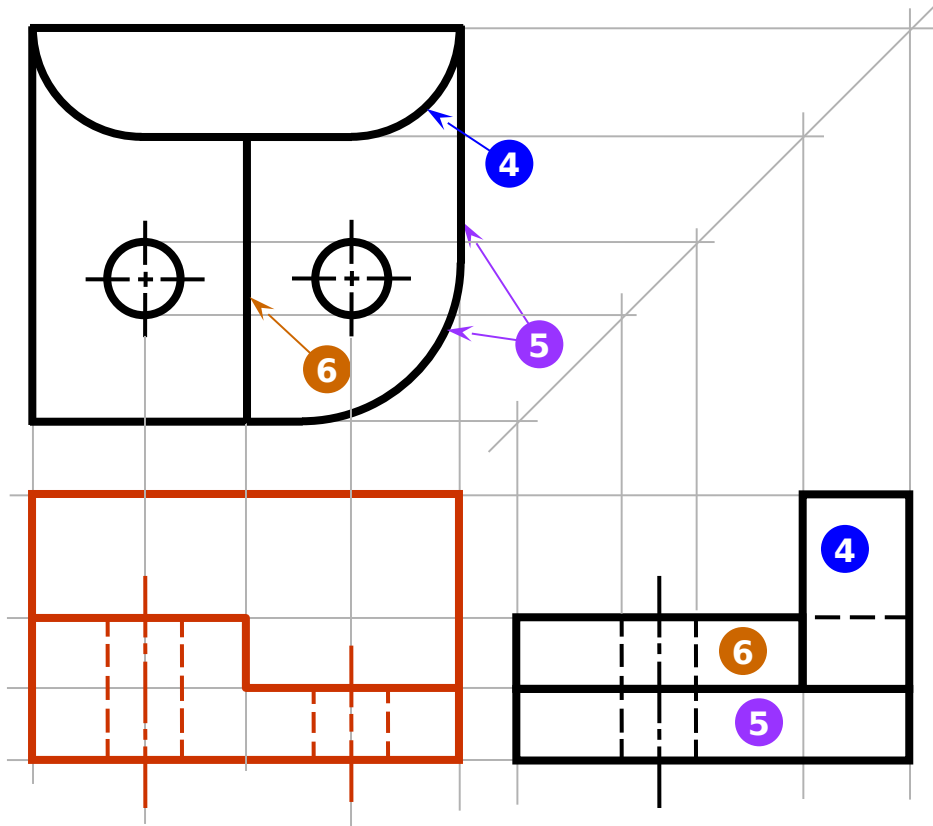
1

2

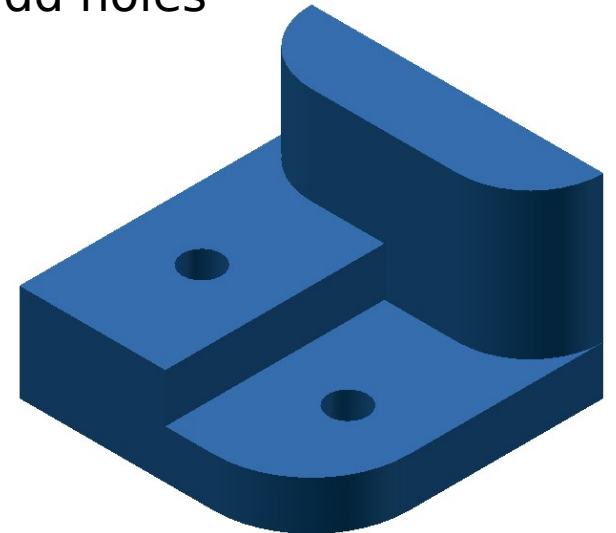
3



Example 2 : (2/3)

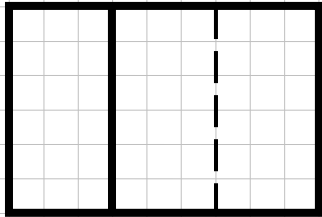
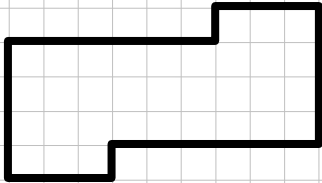


Expect the remaining surface and add holes

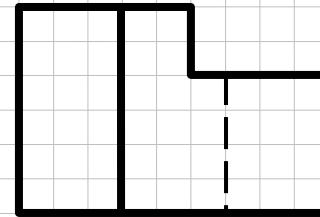
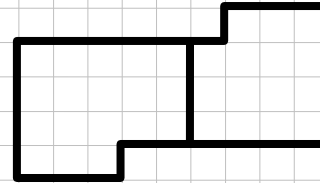


Self practice

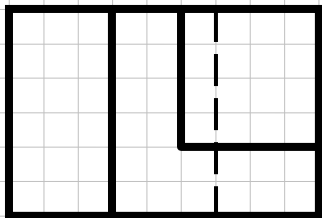
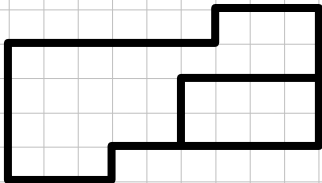
1 Add right side view



2 Add right side view



3 Add right side view



4 Add right side view

