Lecture 12

ISOMETRIC PROJECTIONS

:: BASICS

TA 101 : Engineering Graphics

2007-08 Semester II

January – May 2008

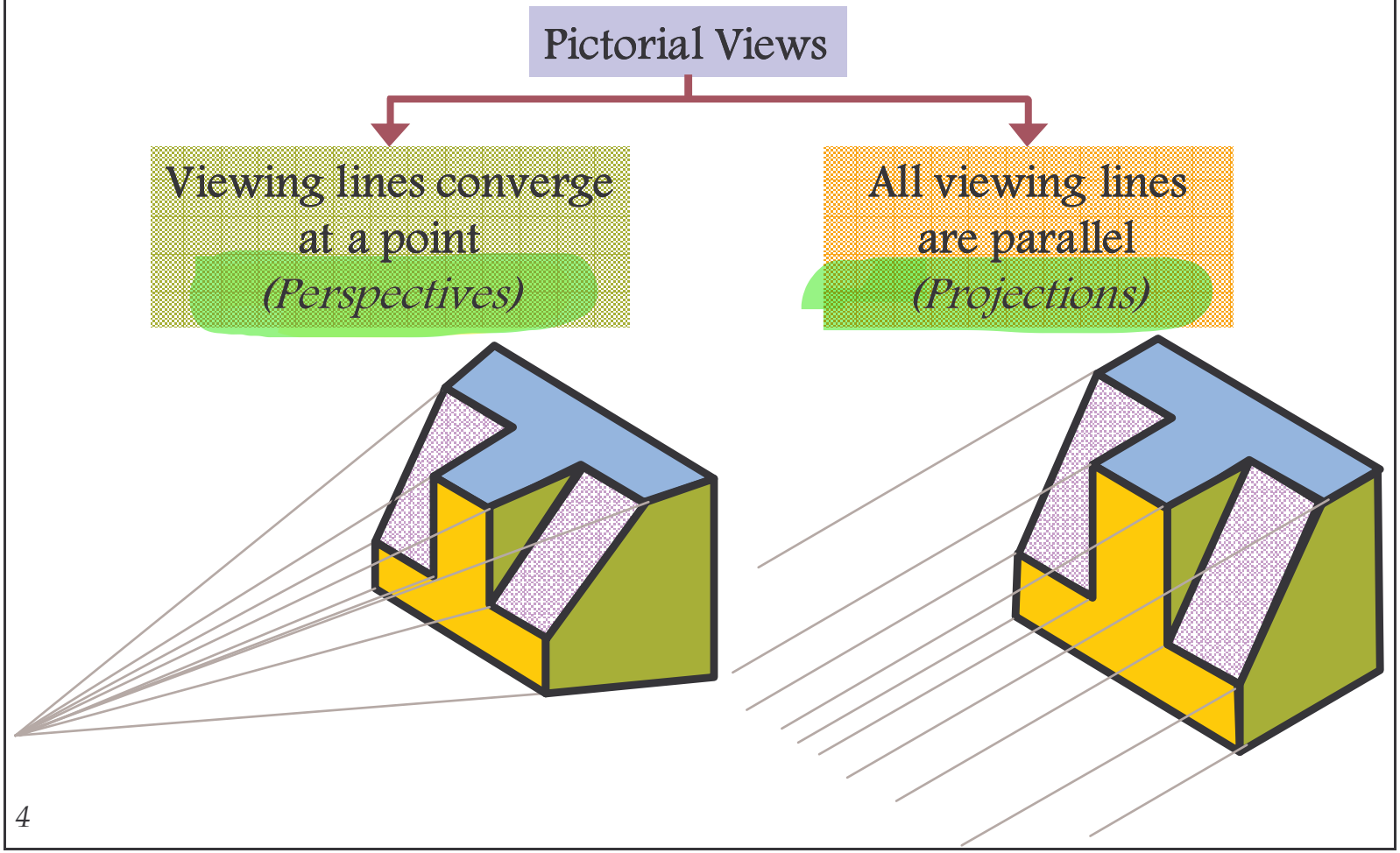
OUTLINE

- Isometric Projections
- Isometric Drawing *versus* Isometric Views
- Examples

ISOMETRIC PROJECTIONS

CLASSIFICATION

- Pictorial views



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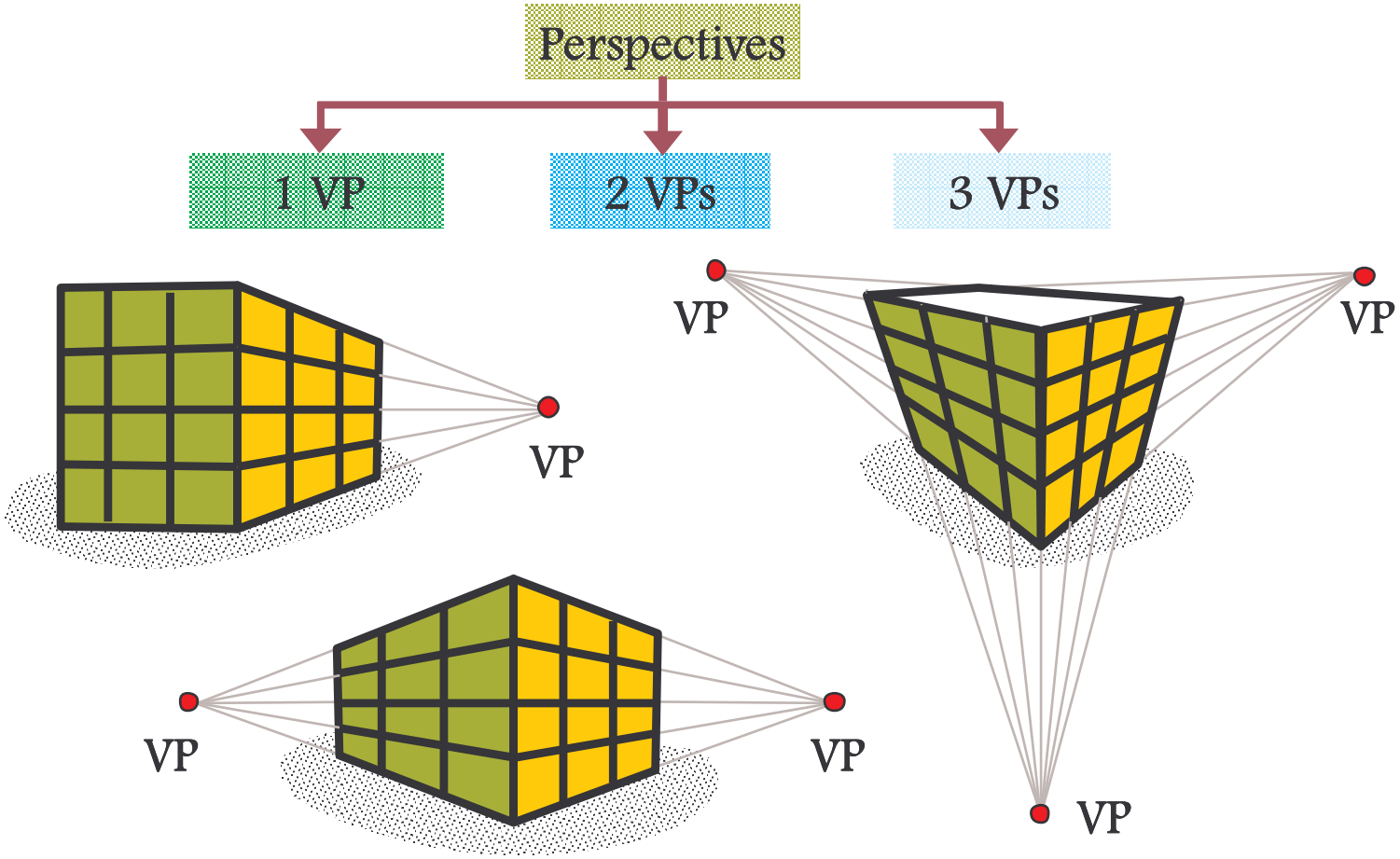
CLASSIFICATION

- Perspective Views



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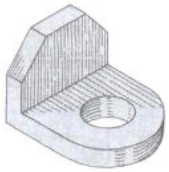
CLASSIFICATION

- Projections

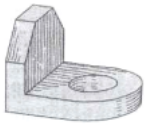
Projections

Viewing plane NORMAL to viewing/projection lines *(Axonometric Projections)*

Isometric

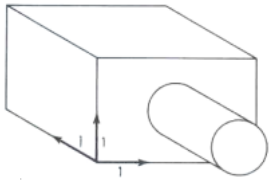


Dimetric

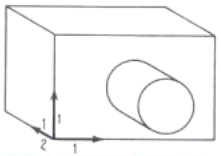


Trimetric

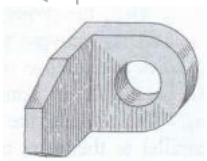
Viewing plane INCLINED to viewing/projection lines *(Oblique Projections)*



Cavalier



Cabinet



Clinographic

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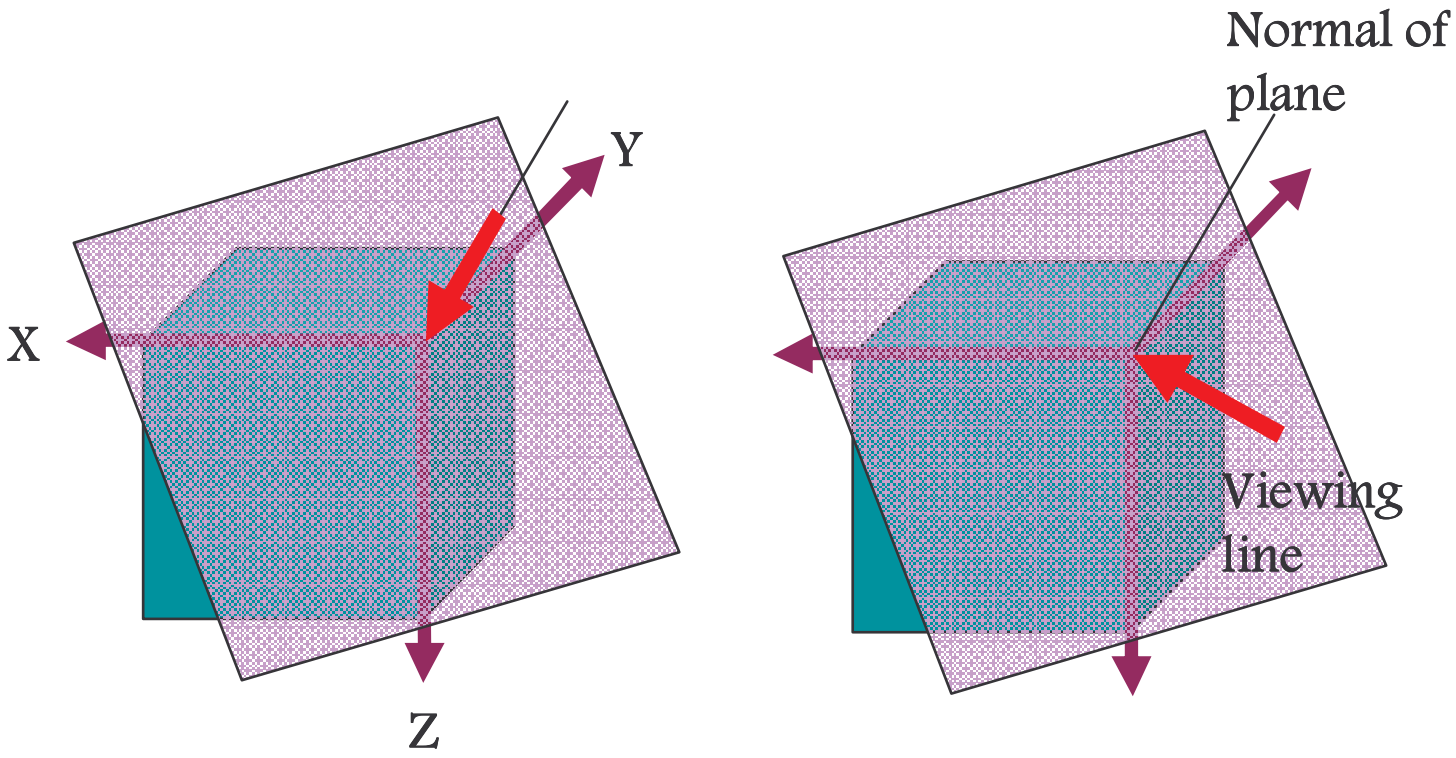
AXONOMETRIC VS OBLIQUE

- Viewing lines versus Viewing plane



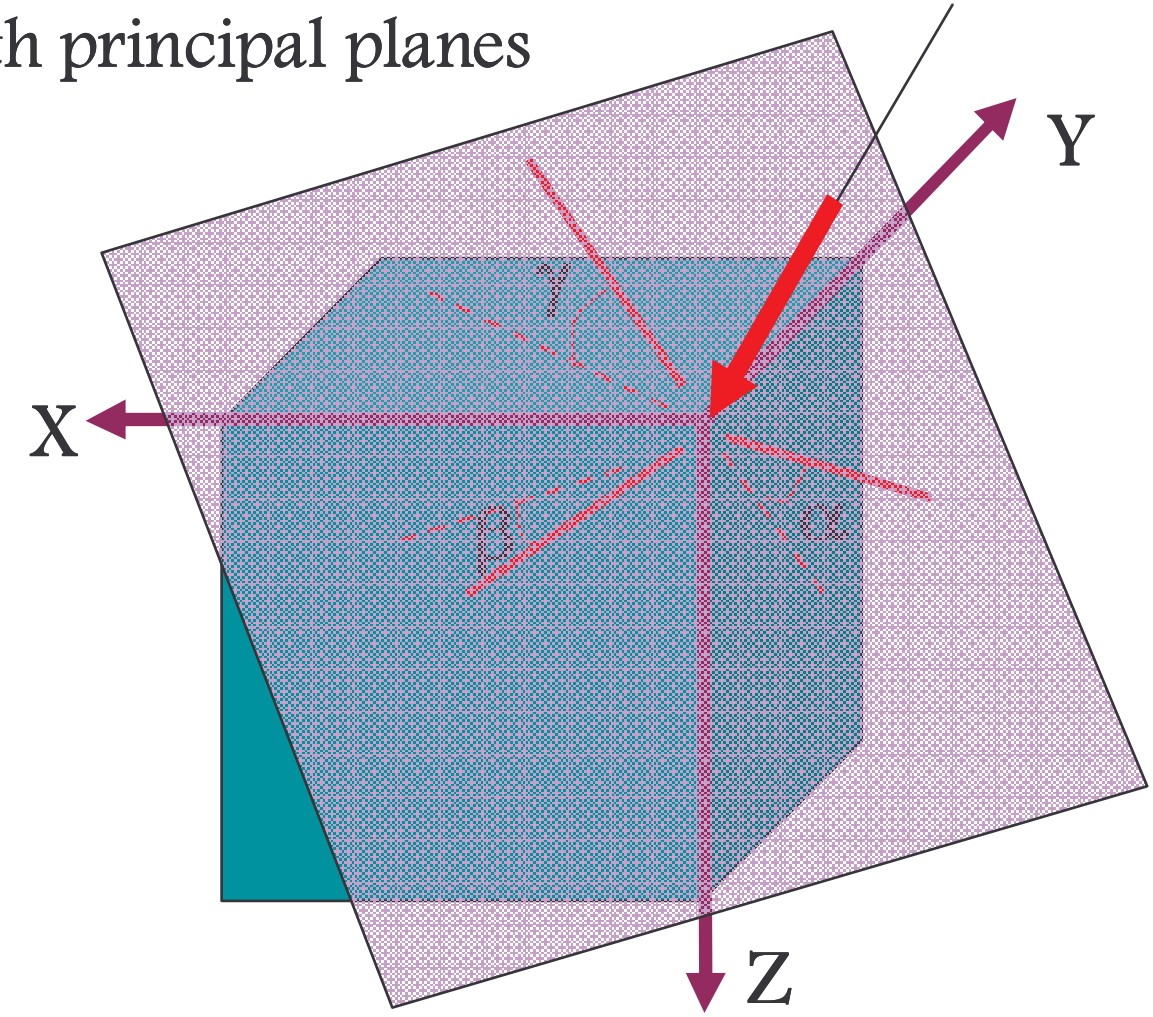
NEED

- Three dimensional clarity
  - Relative proportioning of overall size
  - Relative positioning & sizing of constituent parts
- Realistic feel
  - Assembly of parts to make a bigger object

ISOMETRIC VIEW

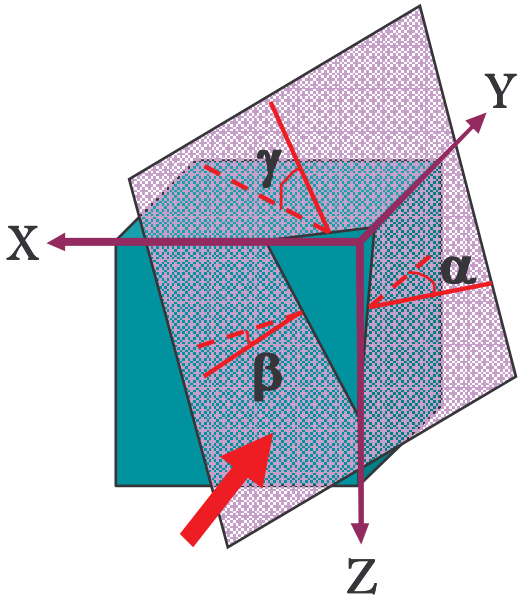
- Angles with principal planes
  - Trimetric

$$\alpha \neq \beta \neq \gamma$$



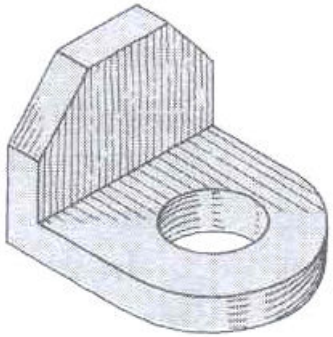
ISOMETRIC VIEW

- Axonometric Projections
  - Viewing plane NORMAL to viewing/projection lines



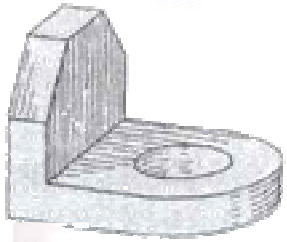
Isometric

$\alpha = \beta = \gamma$



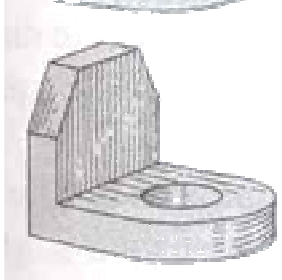
Dimetric

$\alpha = \beta \neq \gamma$



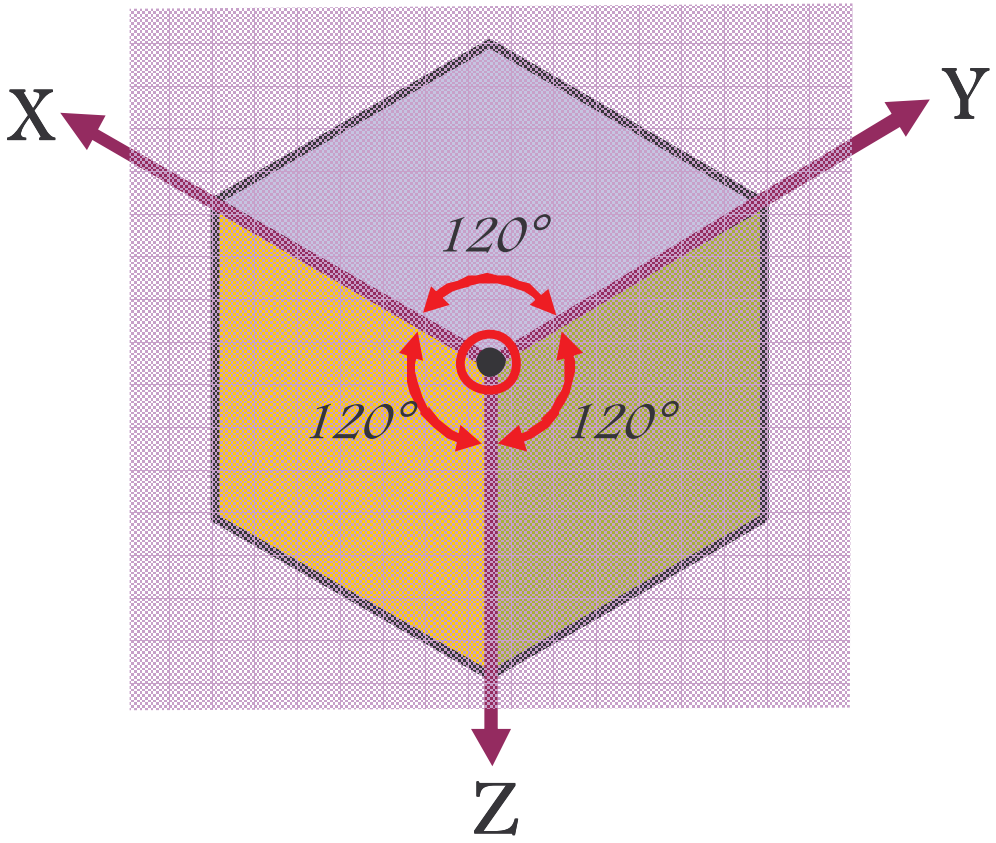
Trimetric

$\alpha \neq \beta \neq \gamma$



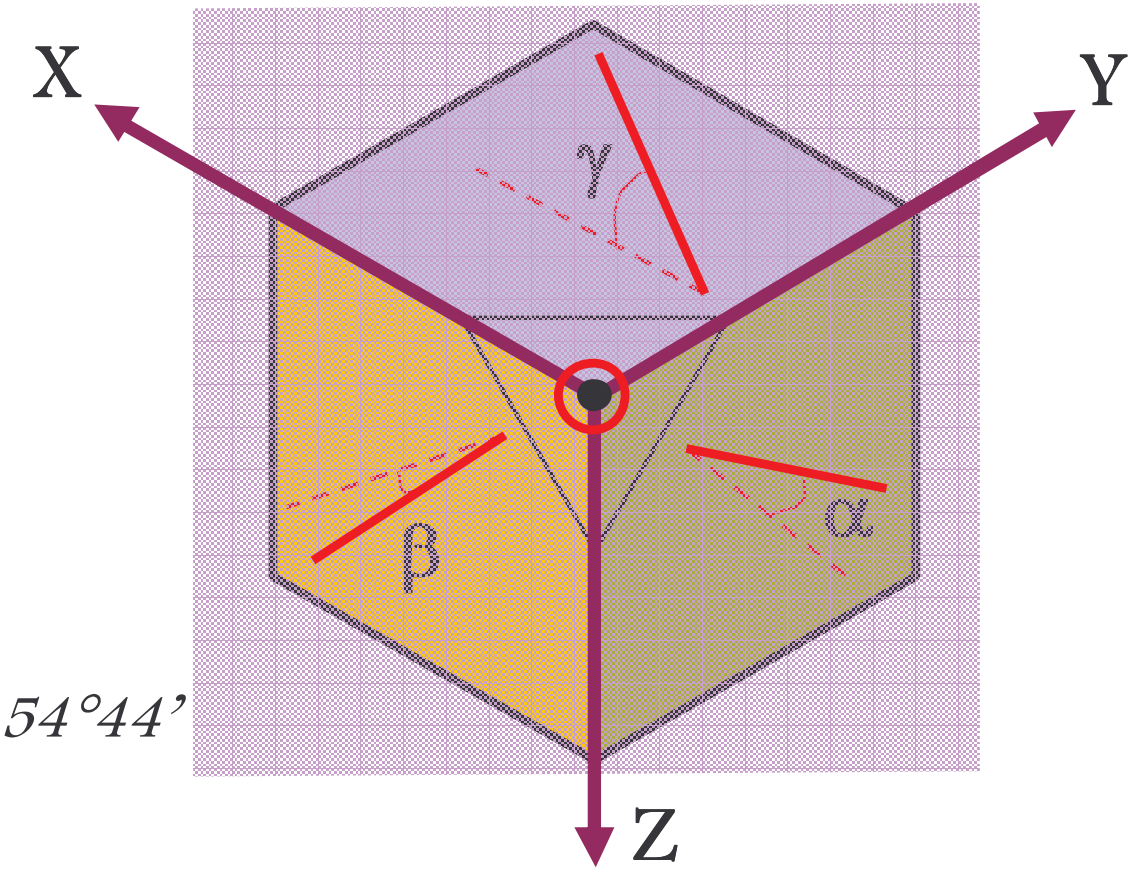
ISOMETRIC VIEW

- Cube in Isometric View



ISOMETRIC VIEW

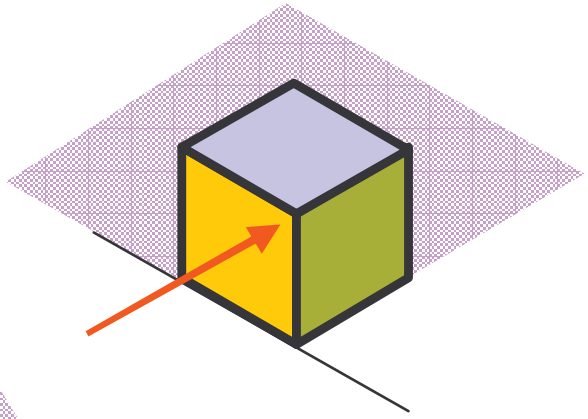
- Cube in Isometric View

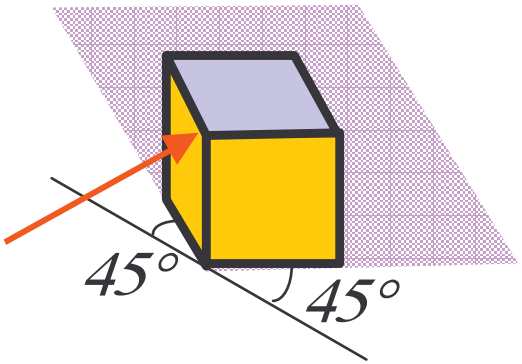


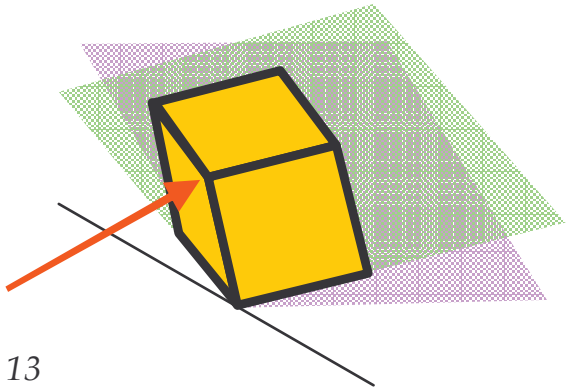
$\alpha = \beta = \gamma = 54°44'$

ISOMETRIC VIEW

- Viewing direction fixed
  - Cube rotated

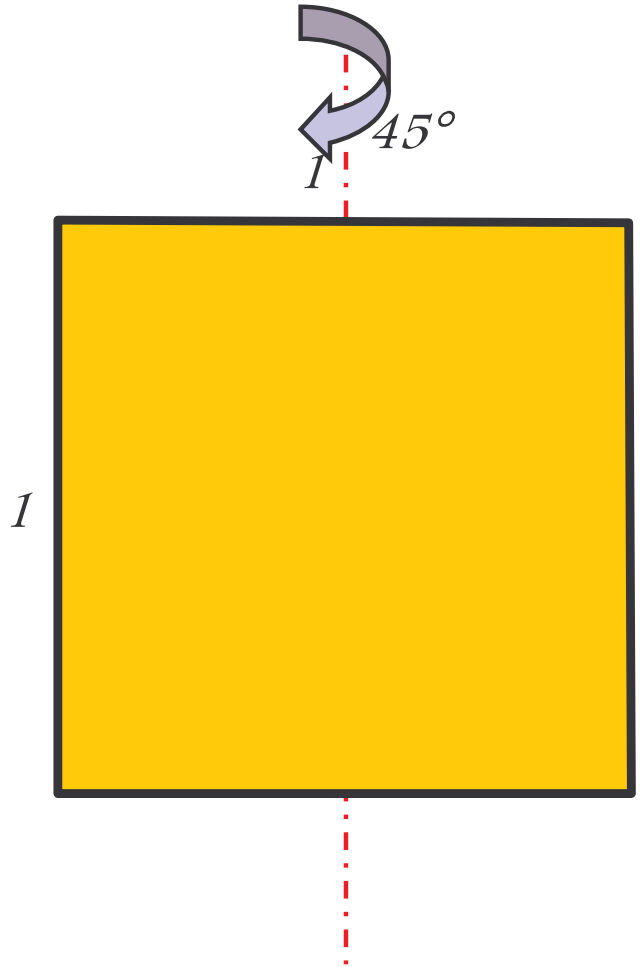


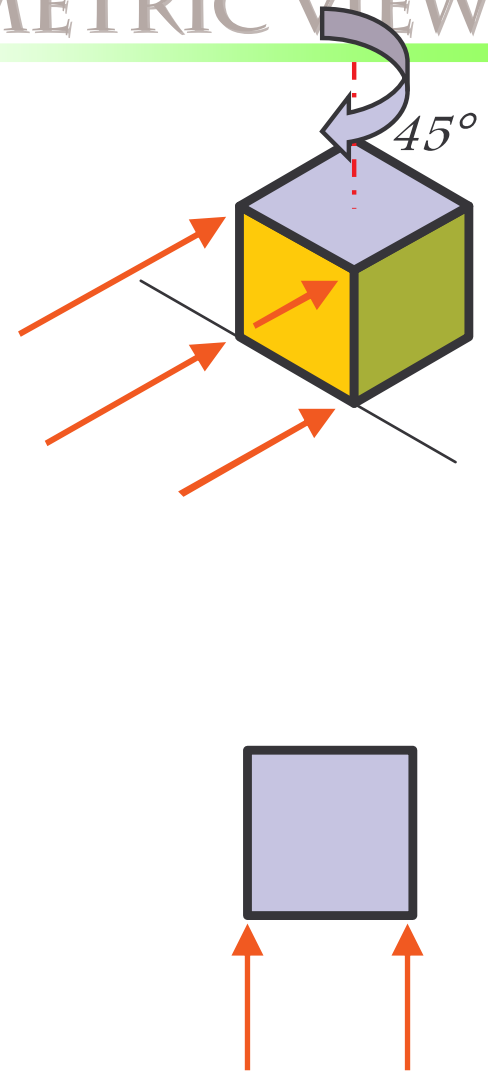




ISOMETRIC VIEW

- Step 1





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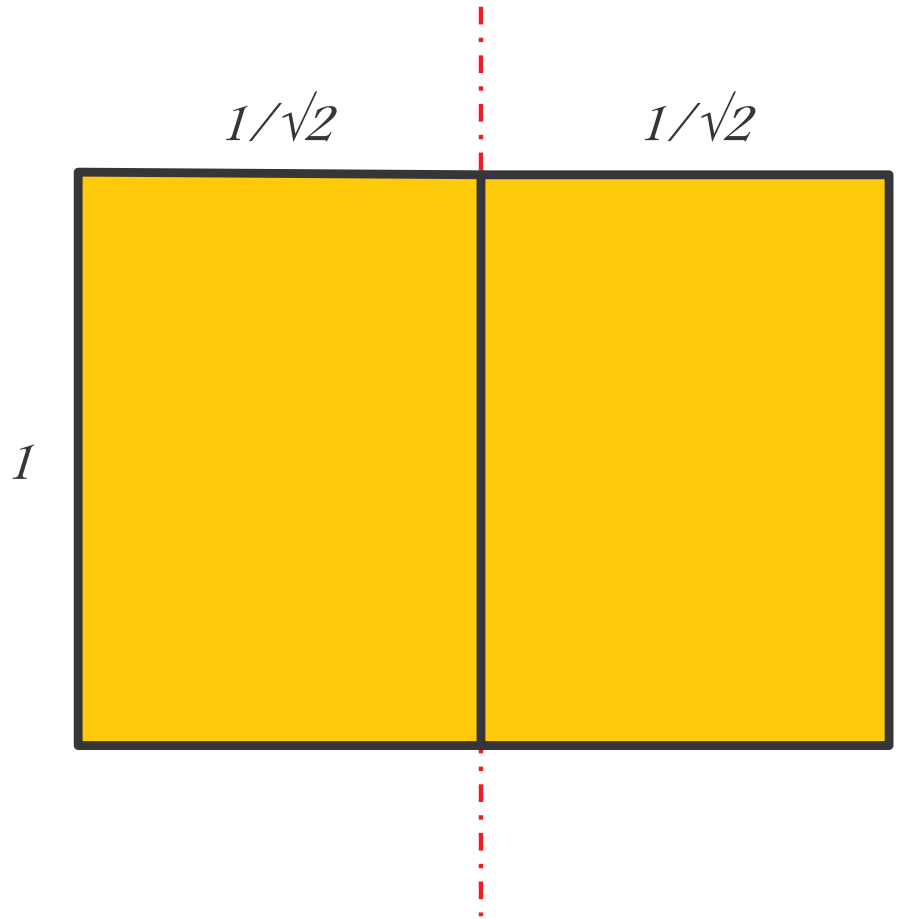
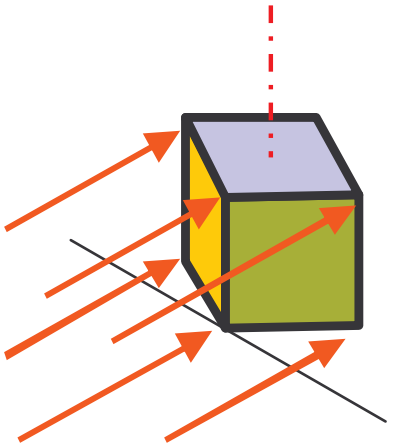
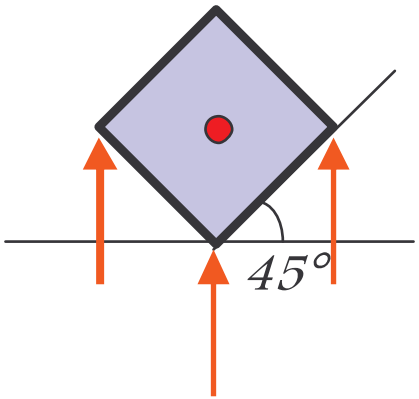
ISOMETRIC VIEW

- Step 2







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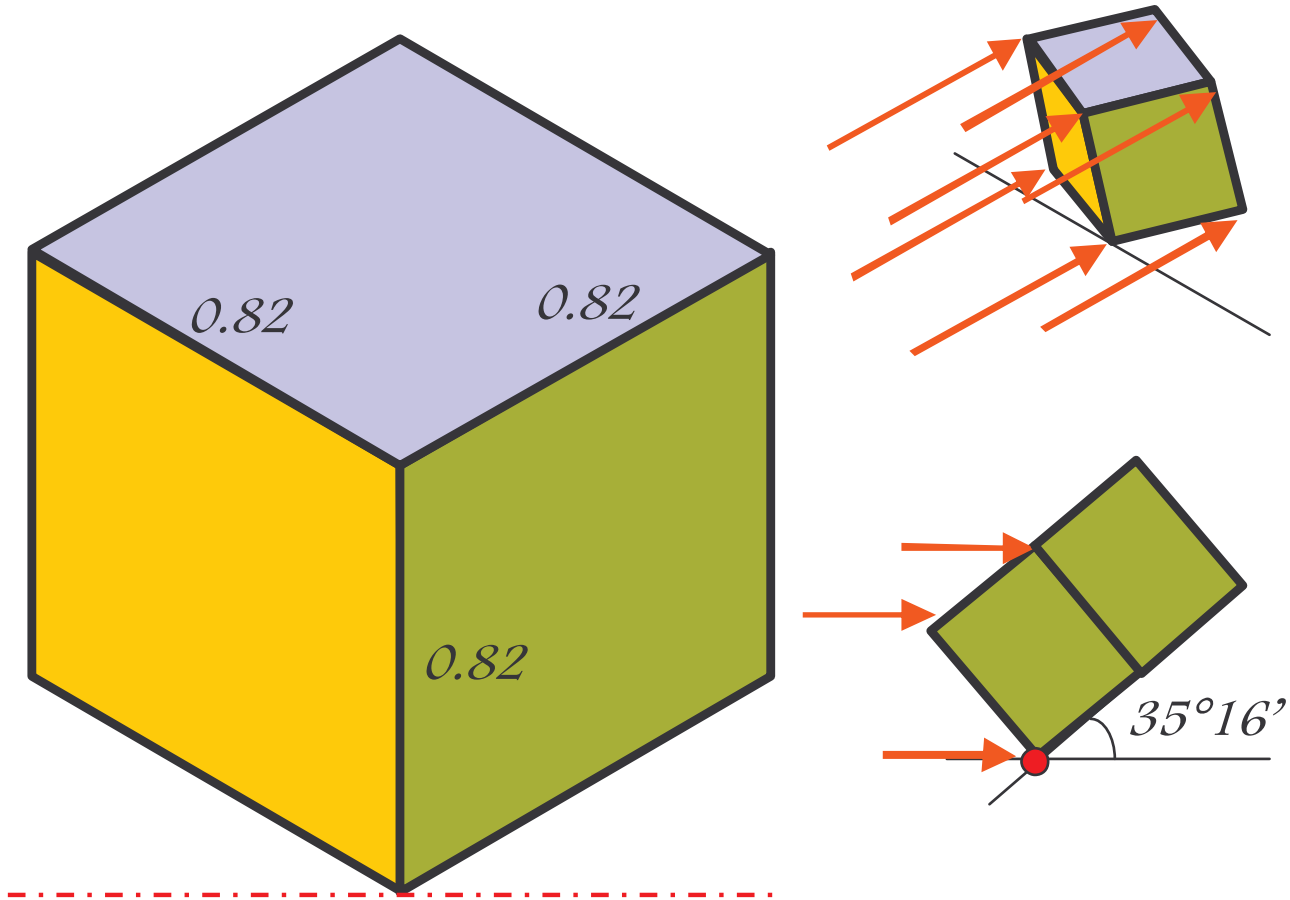
ISOMETRIC VIEW

- Step 3



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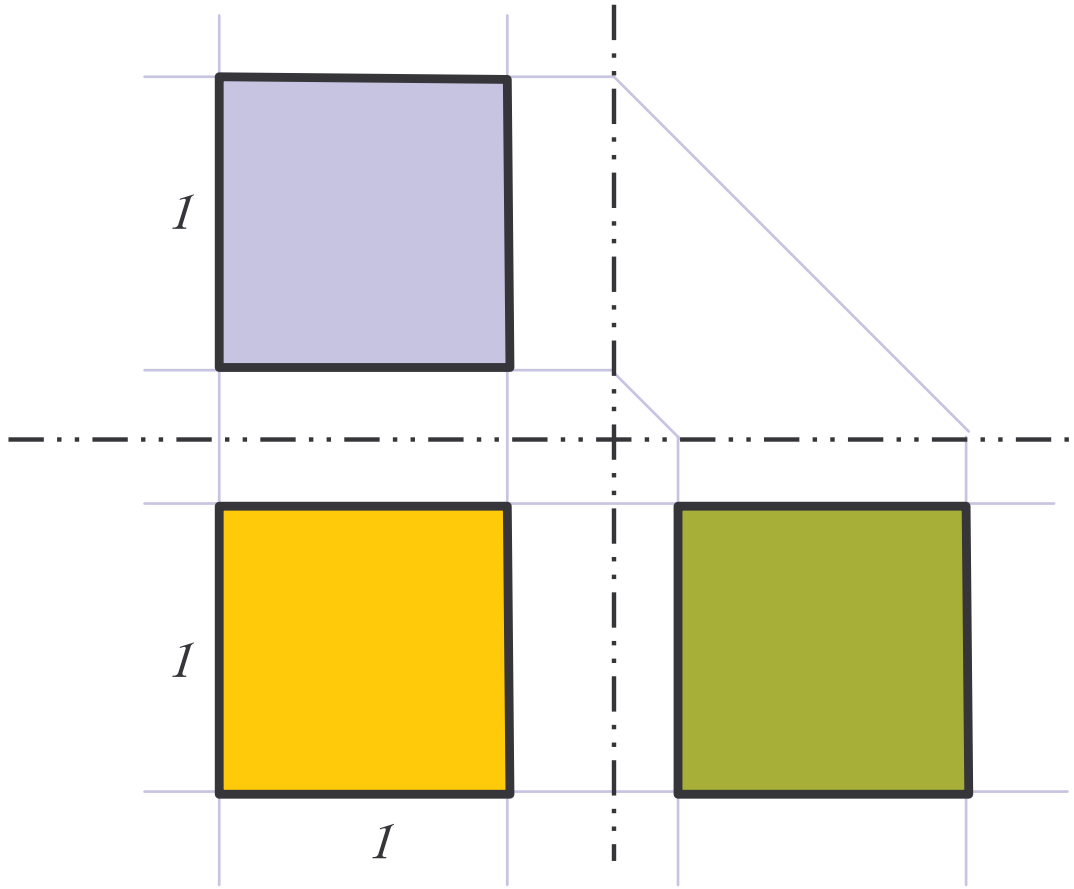
ISOMETRIC VIEW

- Step 1



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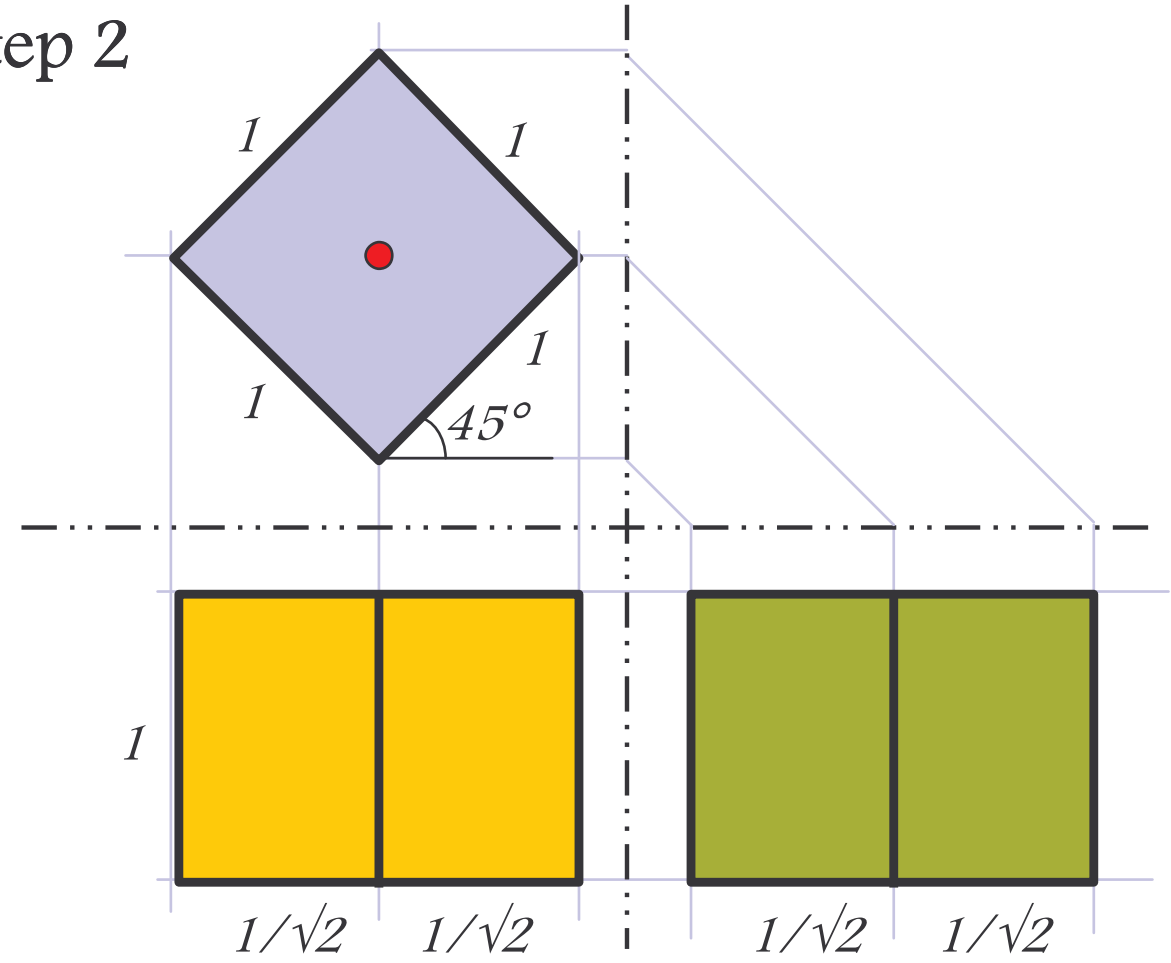
ISOMETRIC VIEW

- Step 2



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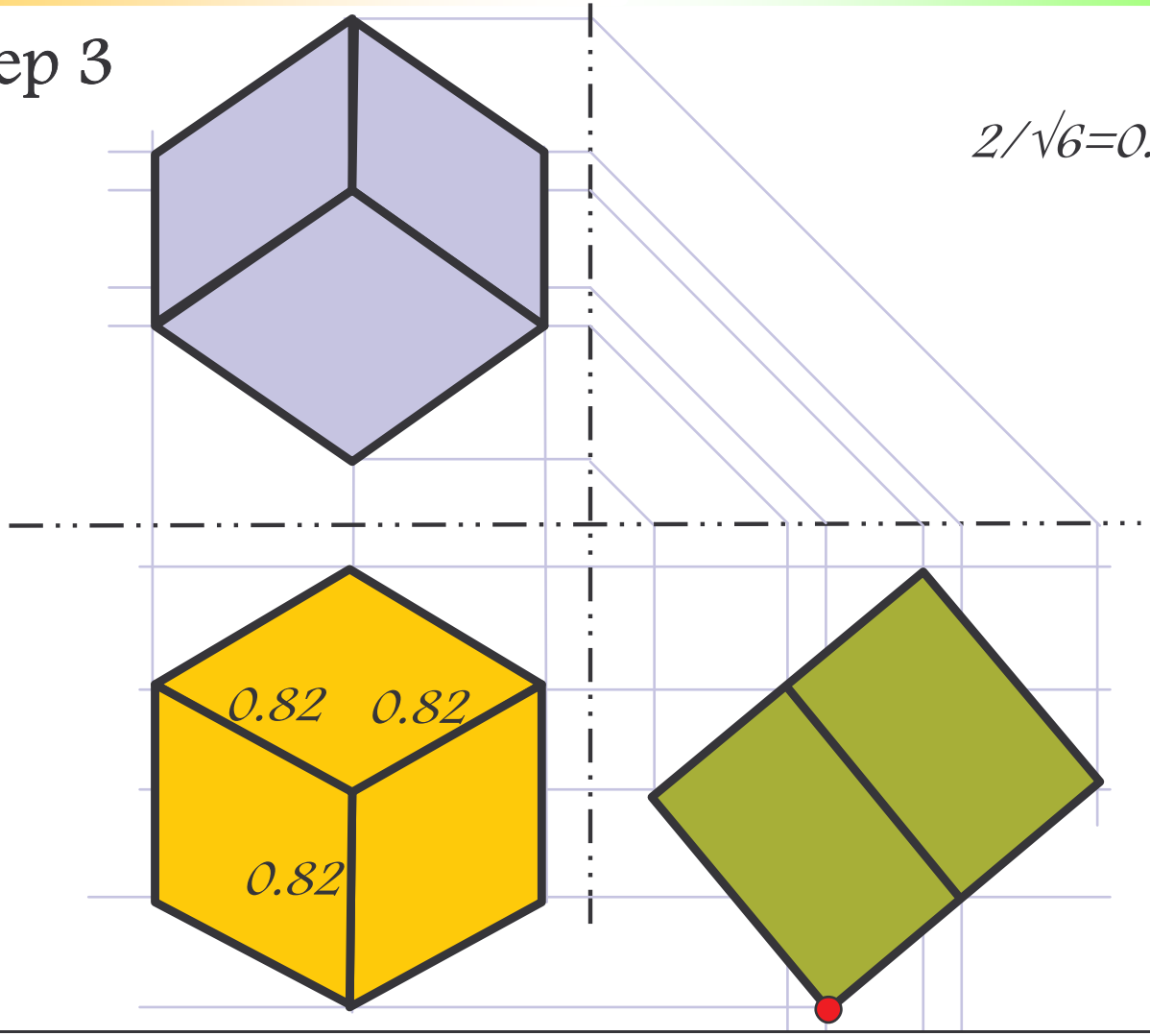
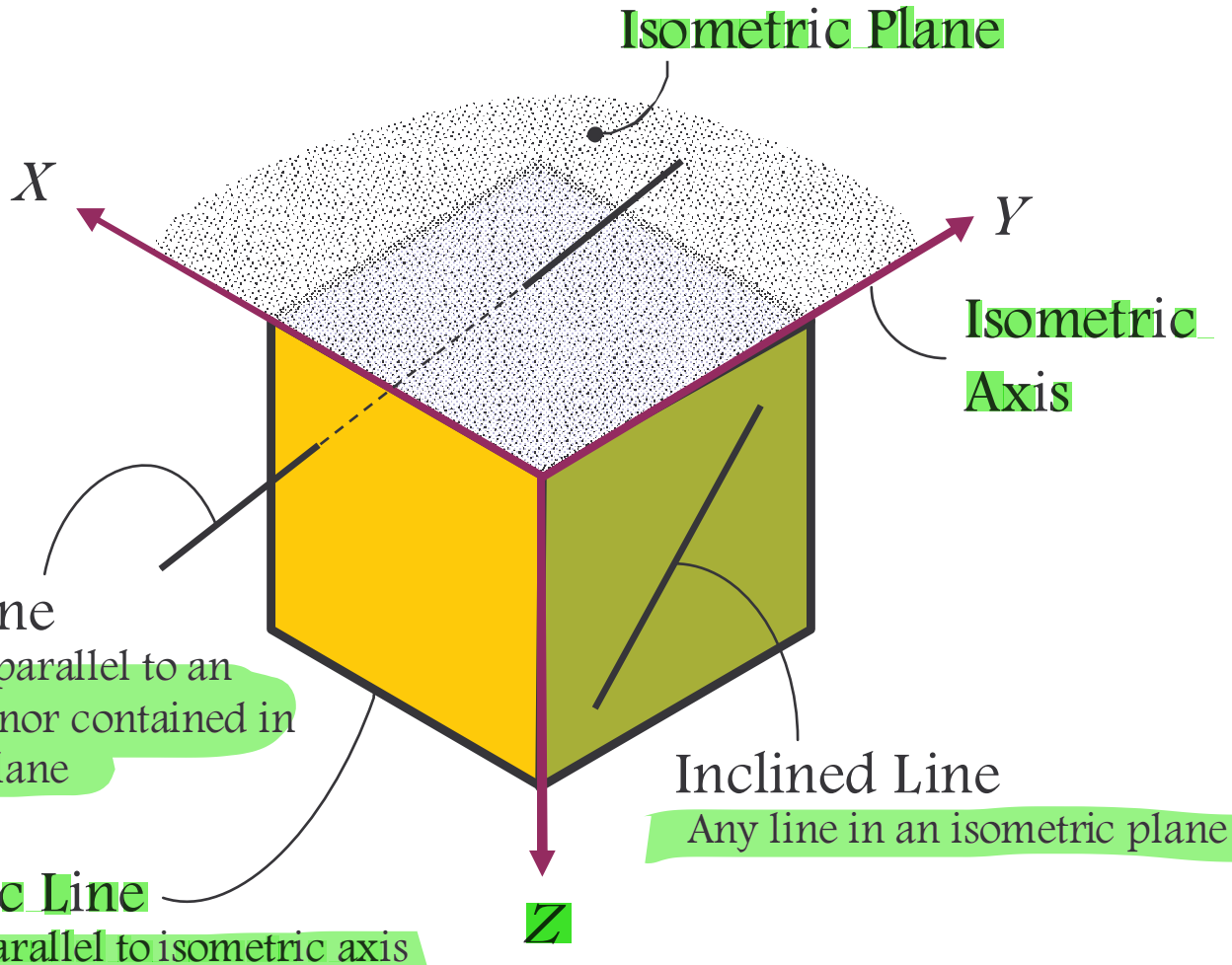
ISOMETRIC VIEW

- Step 3



ISOMETRIC :: PROJECTION vs DRAWING

DEFINITIONS



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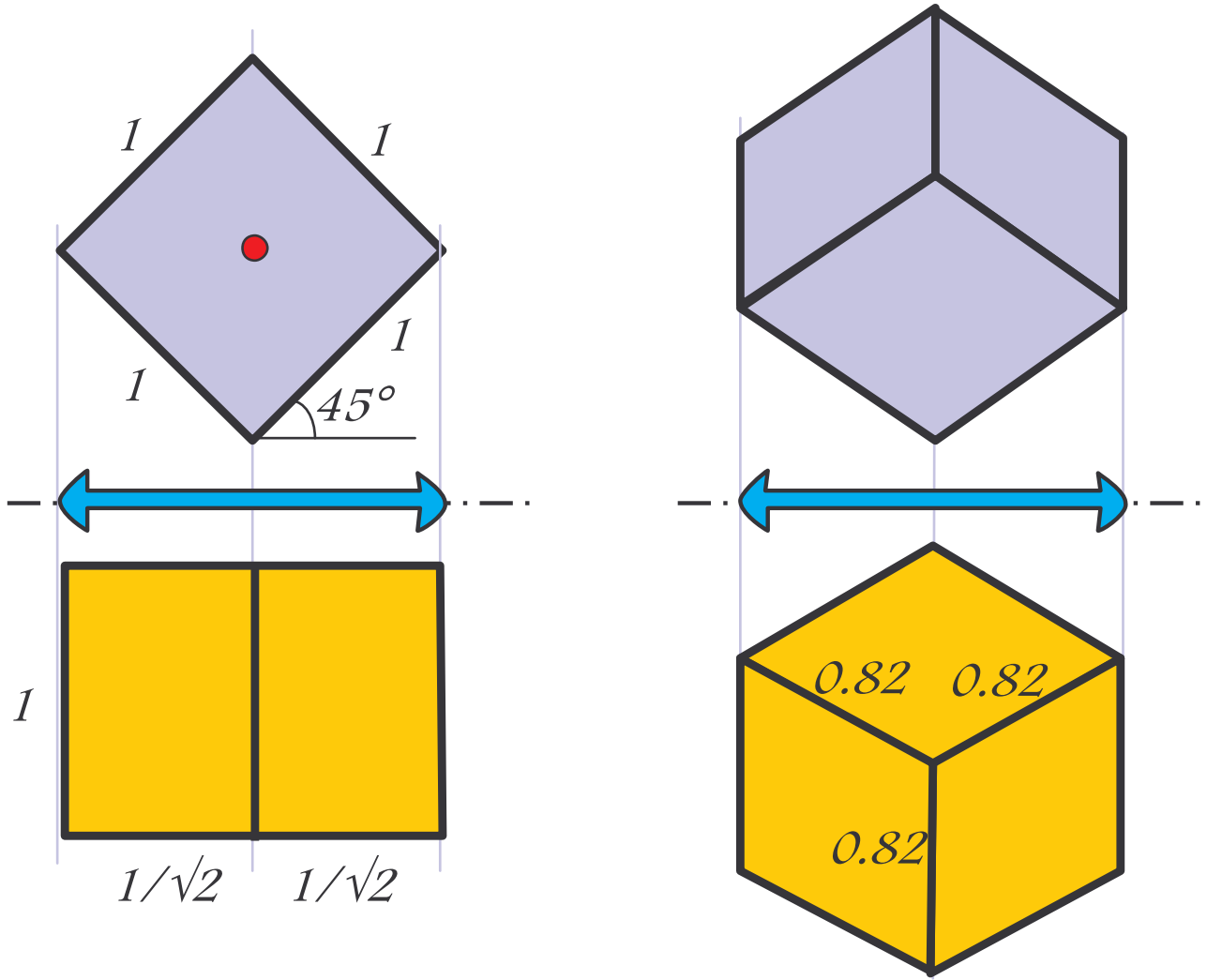
REDUCED SIZE



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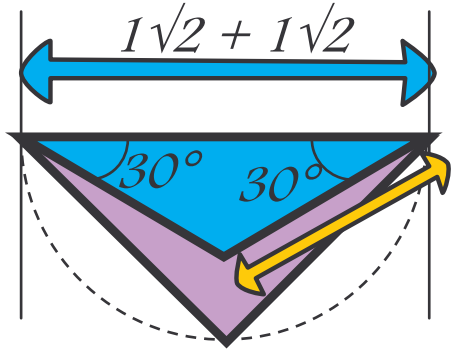
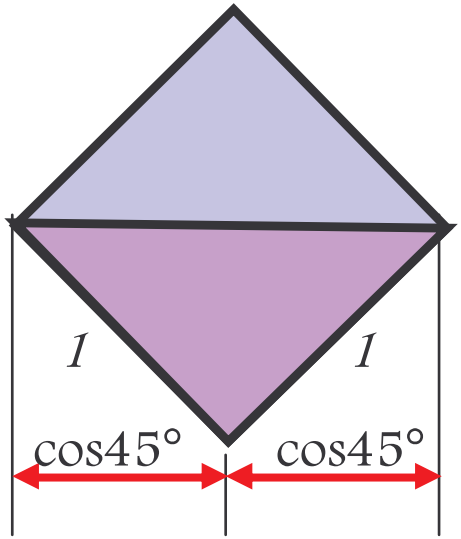
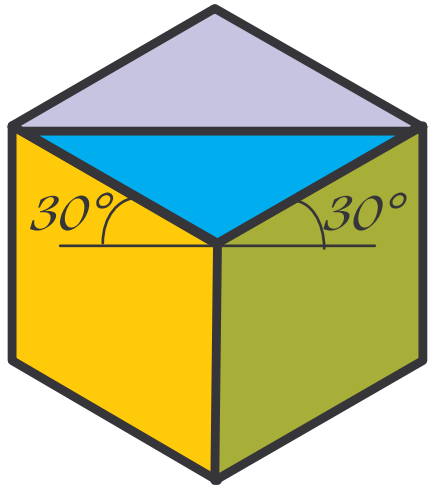
REDUCED SIZE

- Object smaller in Isometric Projection
  - All isometric lines fore-shortened by same amount







$$= \frac{\longleftrightarrow /2}{\text{Cos}30°}$$

$$= \cos 45° / \cos 30° = 2/\sqrt{6} = 0.82$$

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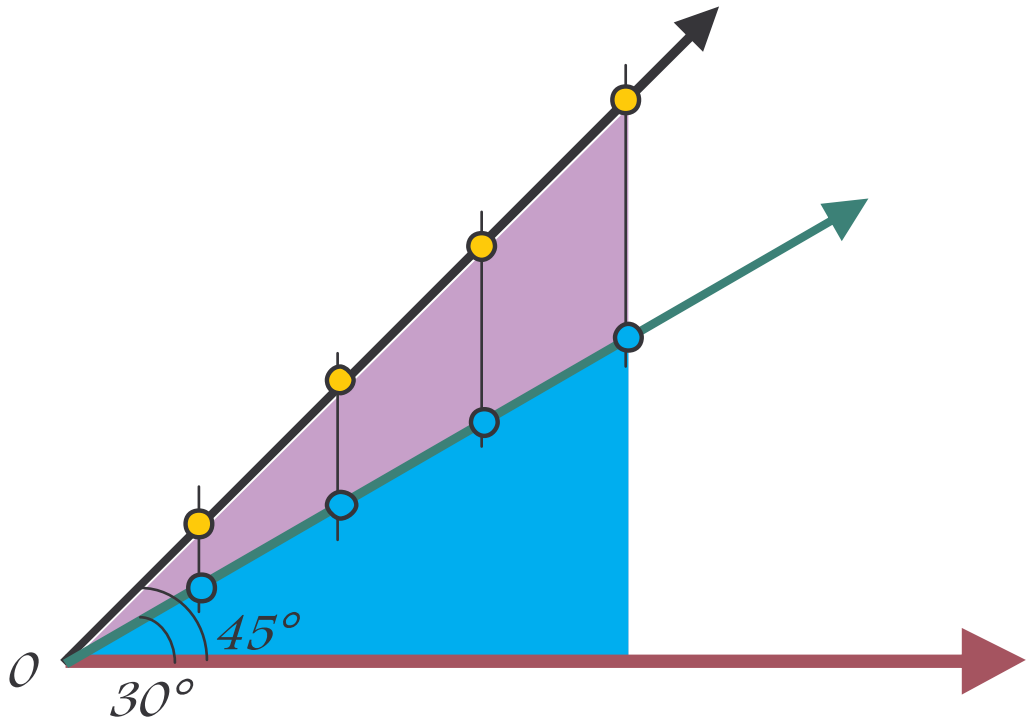
REDUCED SIZE

- Scale for measuring the reduced size
  - 0.82 (=2/√6)



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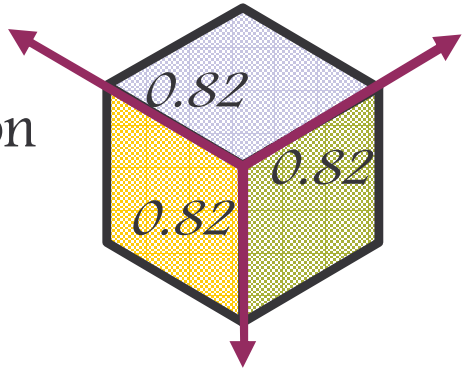
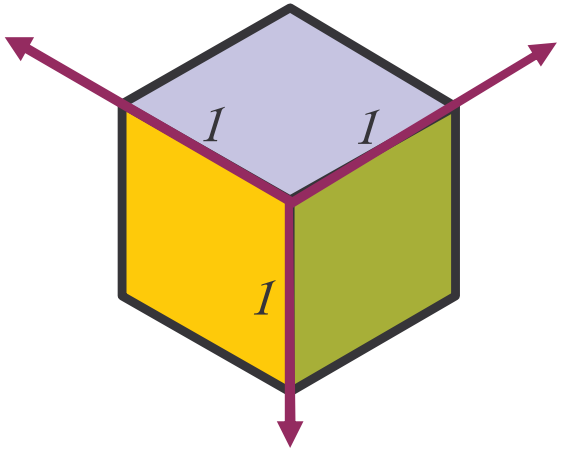
ISOMETRIC PROJECTION vs DRAWING

- Isometric Projection
  - Drawn to fore-shortened dimension
  - Reduced by 0.82 (= 1/1.224)



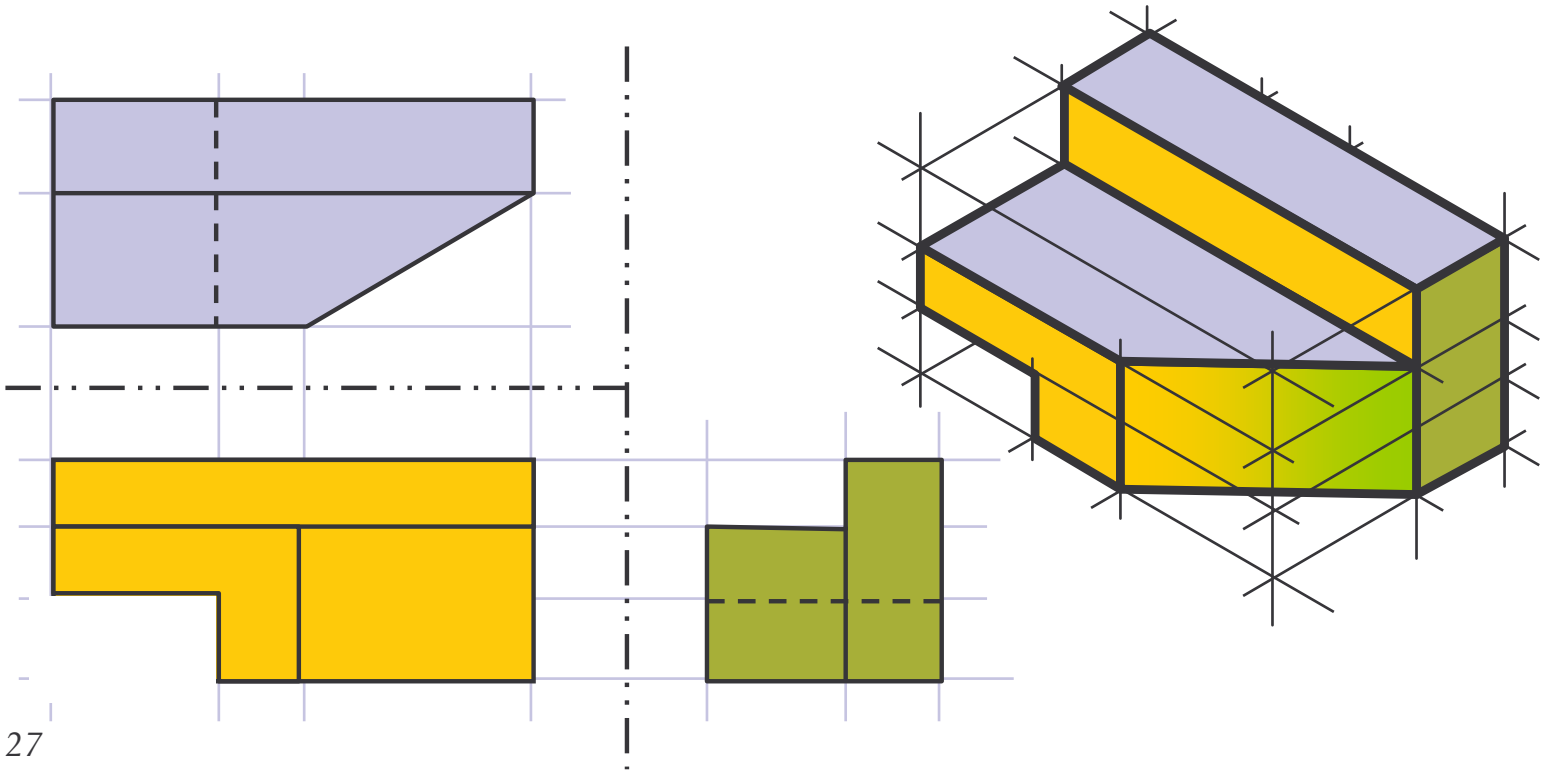
- Isometric Drawing
  - Drawn to full given dimension
    - Since all dimensions fore-shortened by same amount



EXAMPLES

DRAWING AN ISOMETRIC VIEW

- Enveloping Box Method
  - Outer envelope of the object
  - All important points connected by isometric lines



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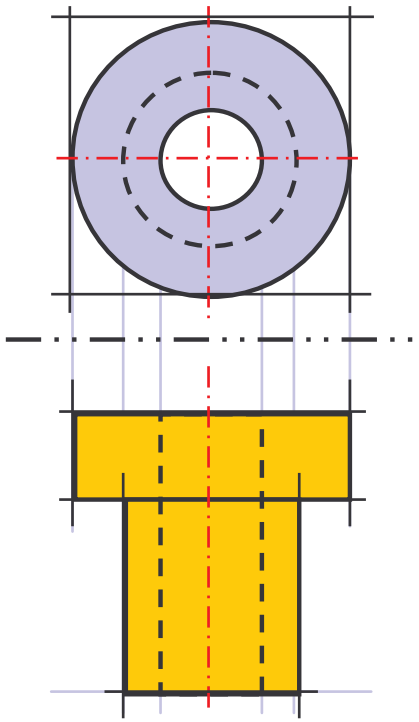
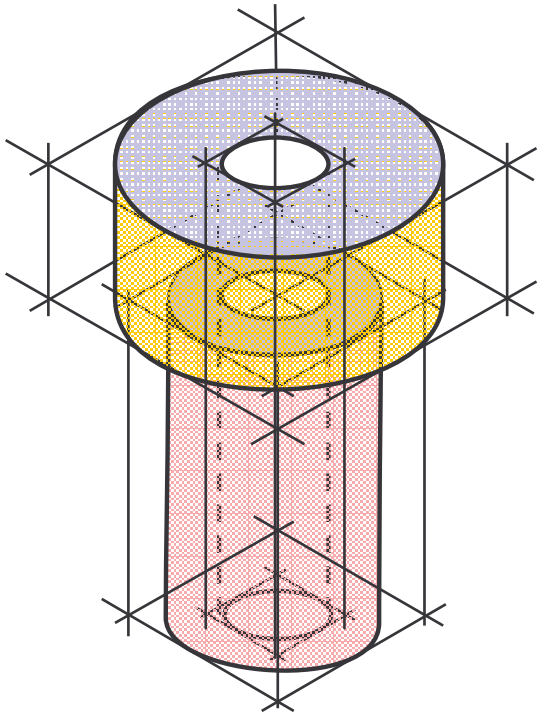
DRAWING AN ISOMETRIC VIEW

- Centerline Method
  - Only for cylindrical portions





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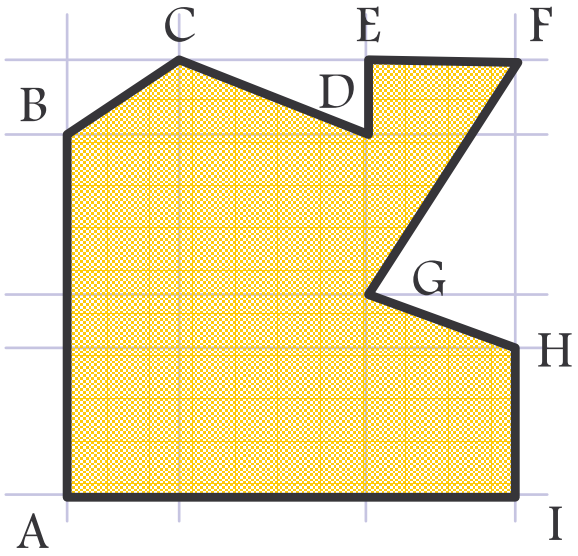
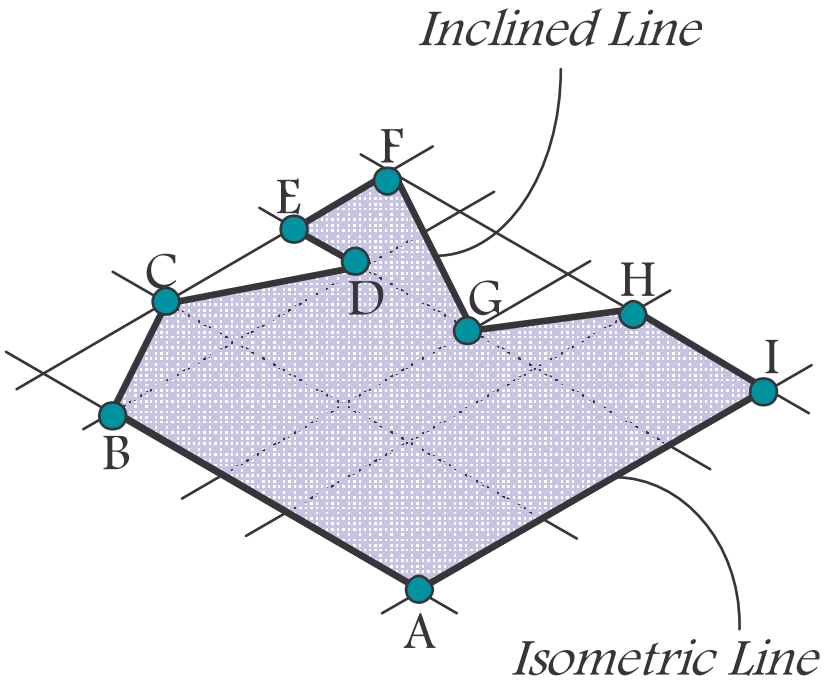
EXAMPLE 1

- Lamina
  - Planar Object



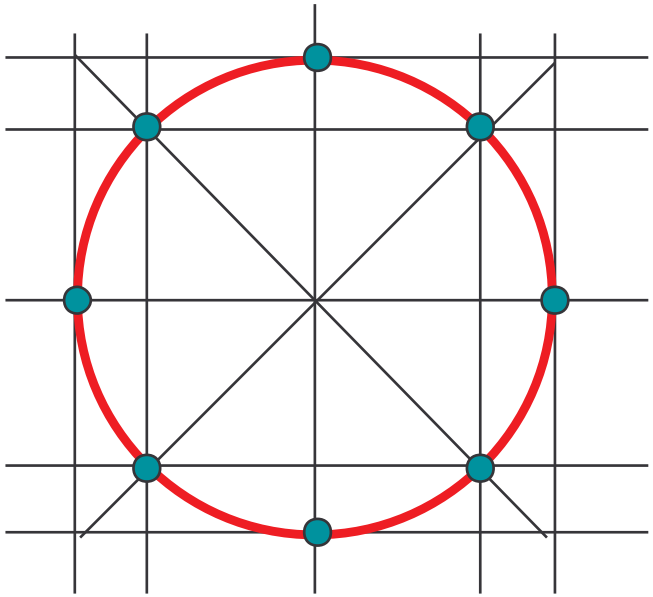
Orthographic View



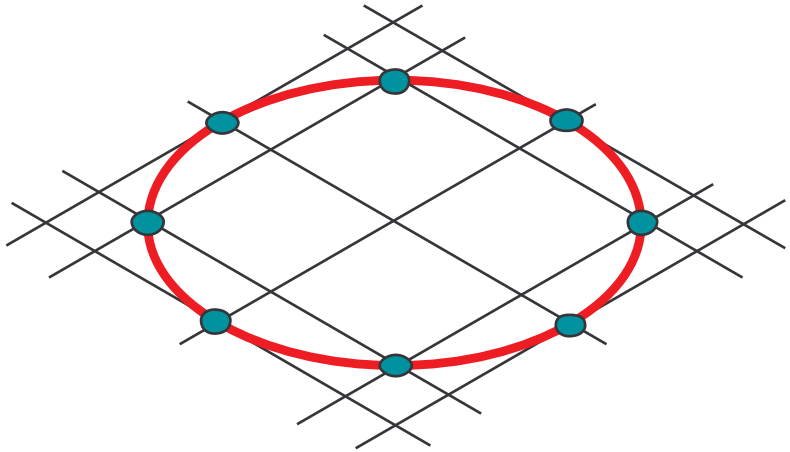
Isometric View

EXAMPLE 2

- Circle
  - Distorted in the plane



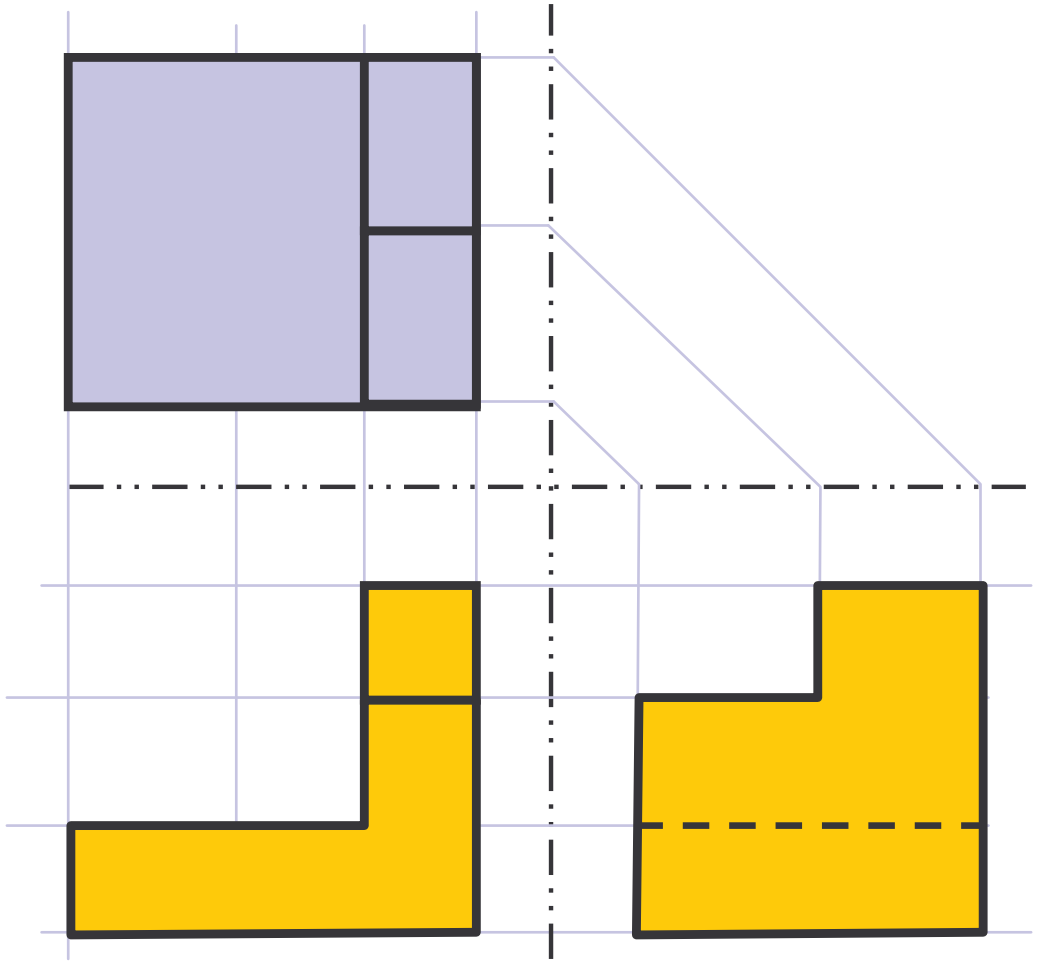
Orthographic View



Isometric View

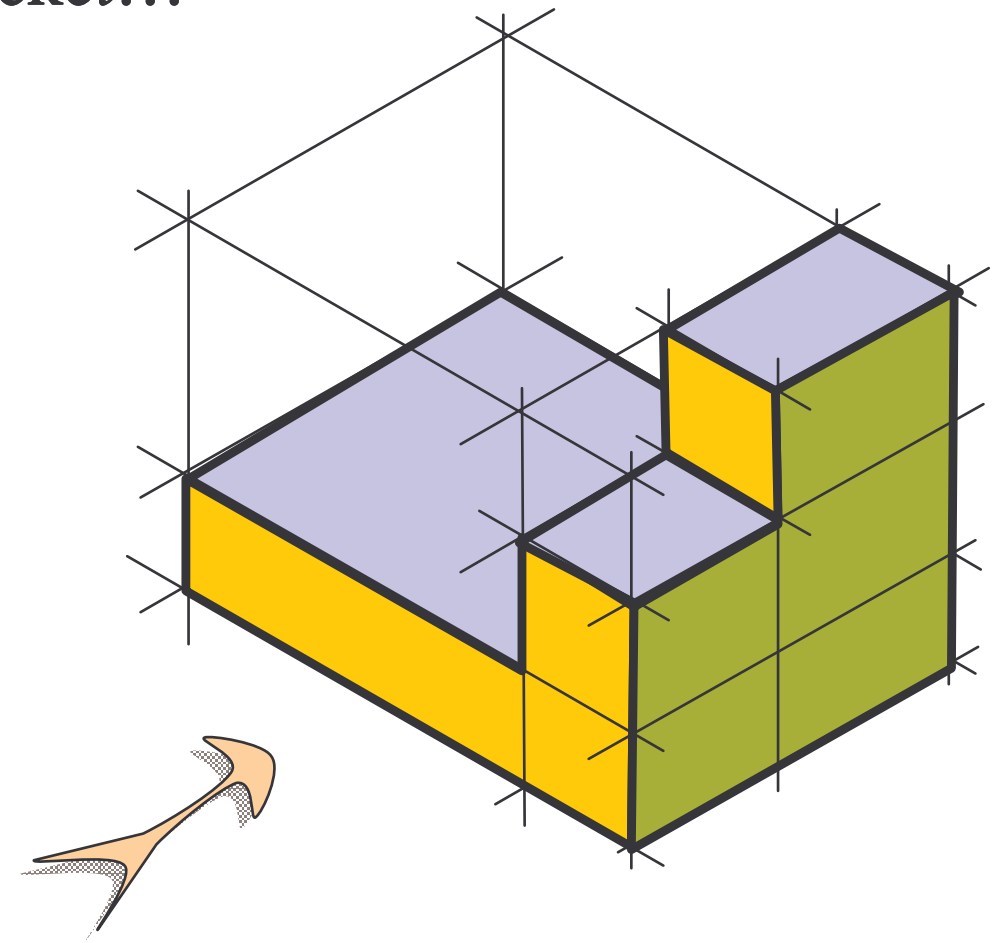
SIMPLE OBJECTS

- Bracket



SIMPLE OBJECTS

- Bracket…



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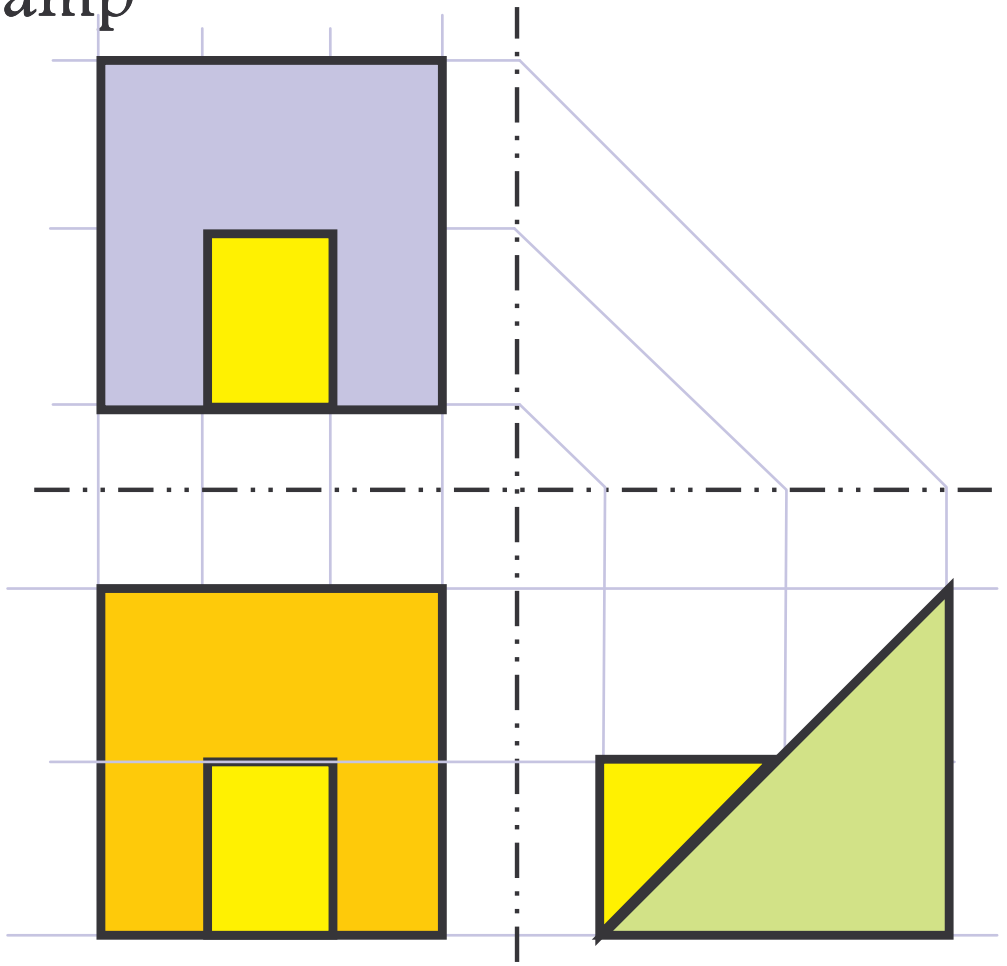
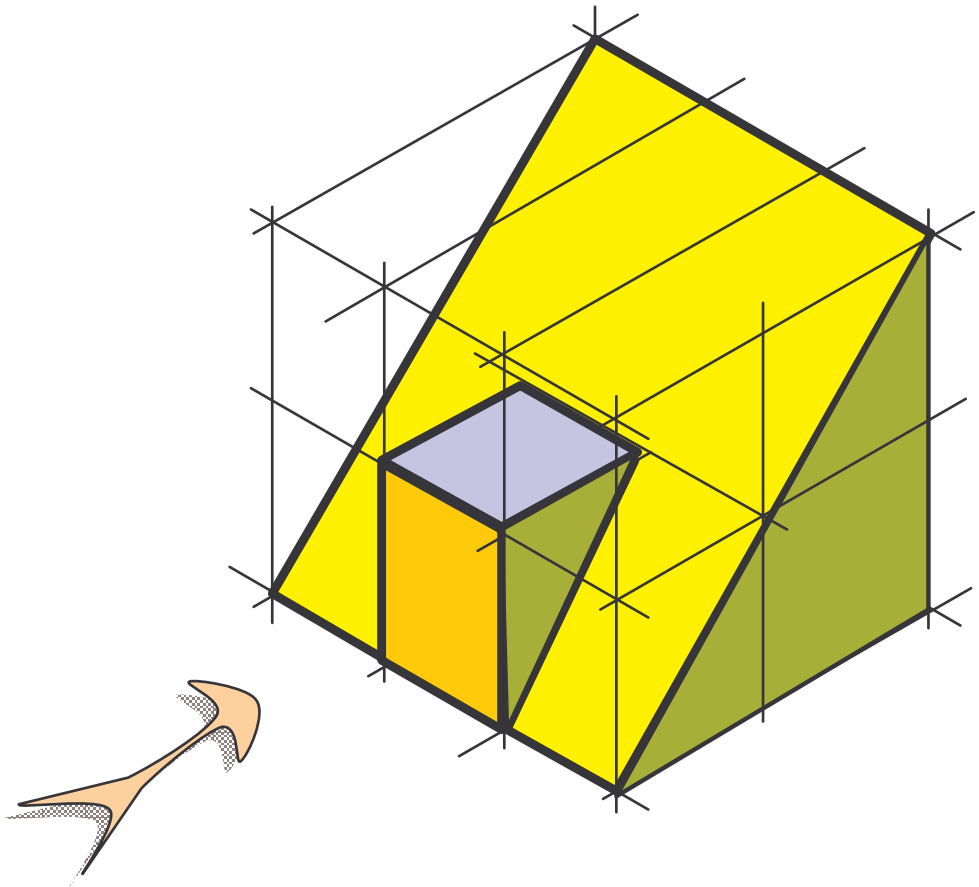
SIMPLE OBJECTS

- Notched ramp



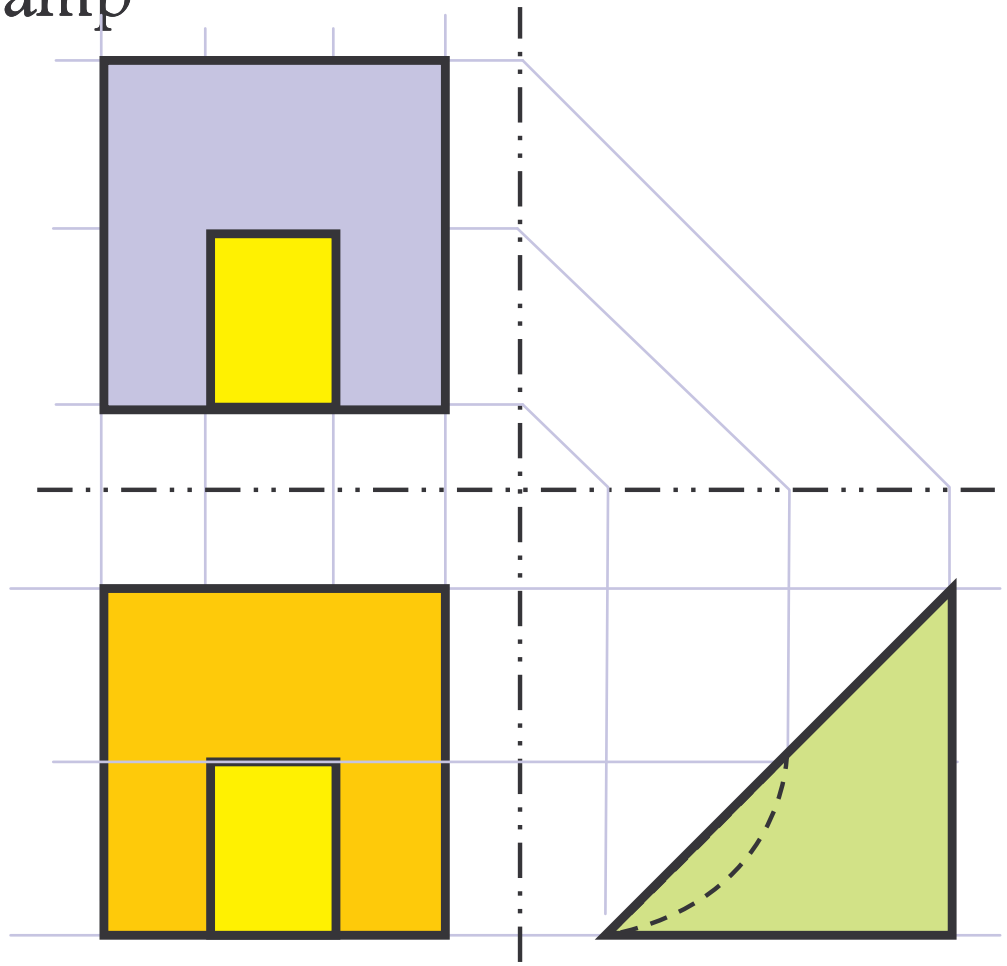
SIMPLE OBJECTS

- Notched ramp…



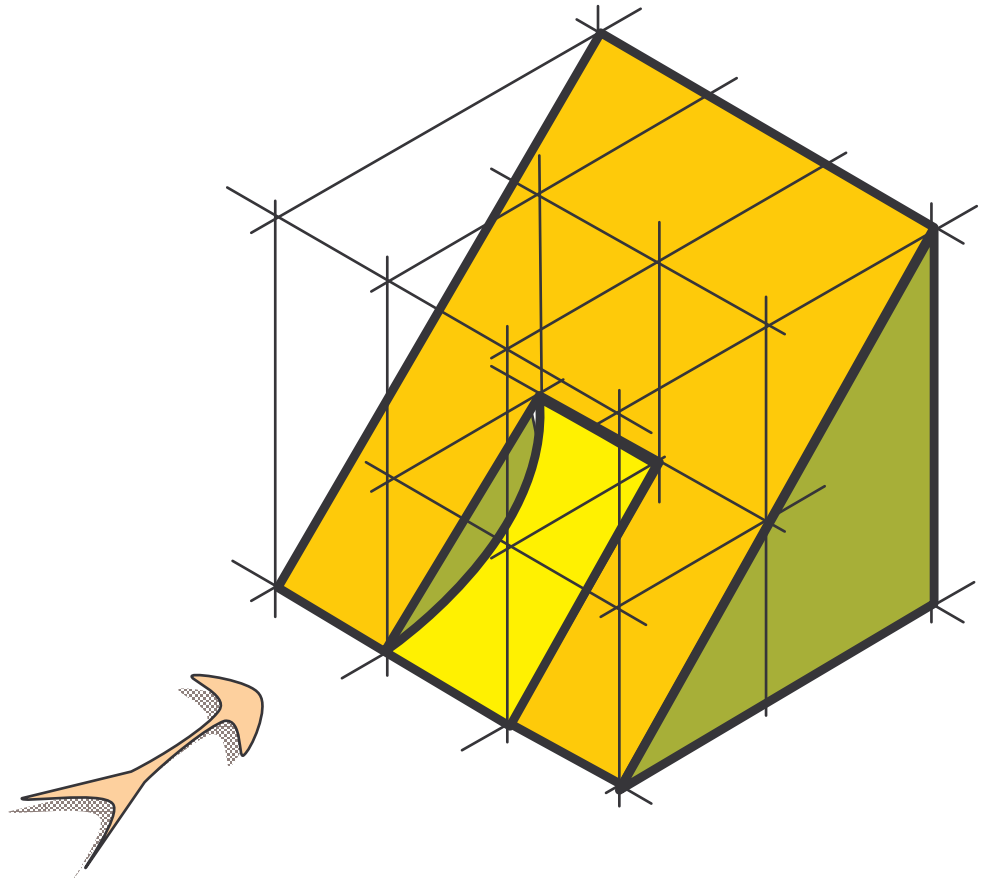
SIMPLE OBJECTS

- Scooped ramp



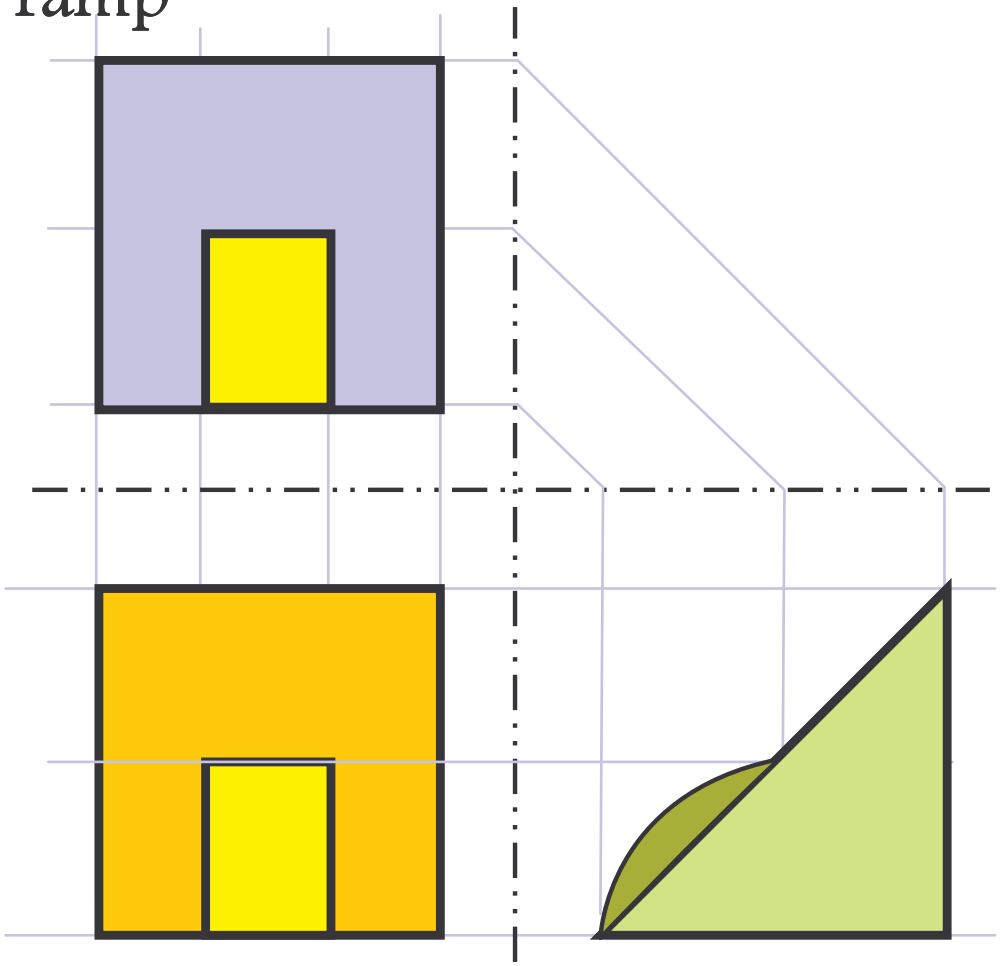
SIMPLE OBJECTS

- Scooped ramp…



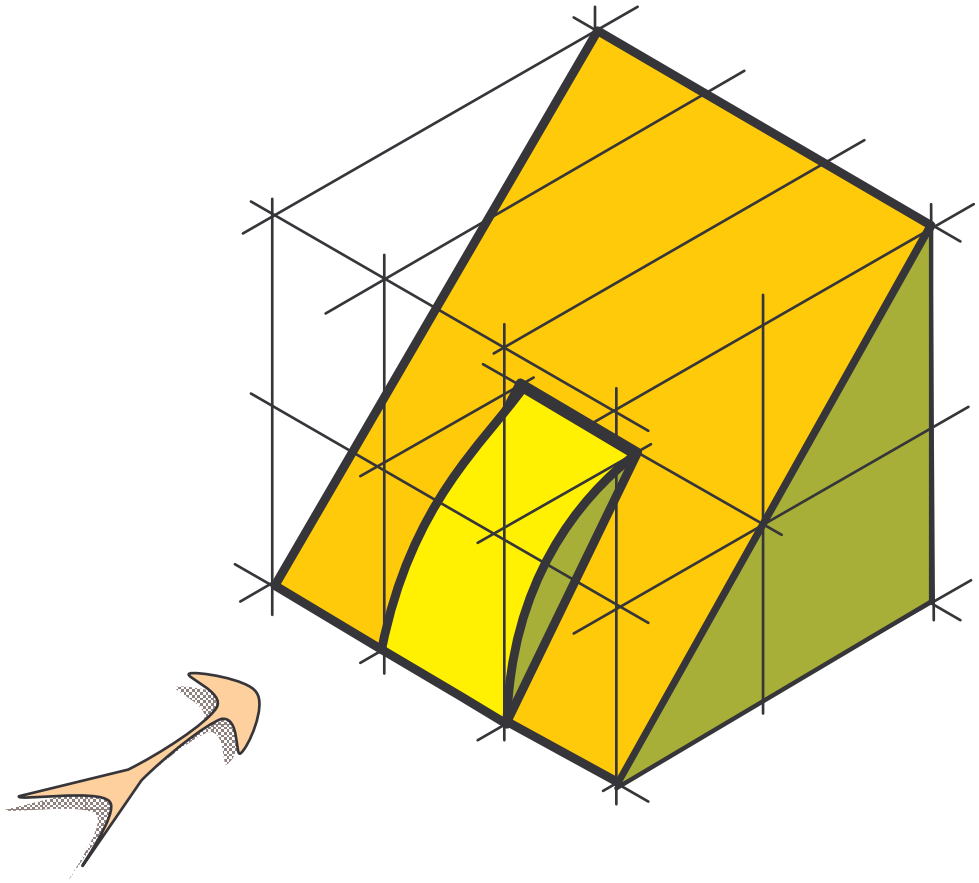
SIMPLE OBJECTS

- Embossed ramp



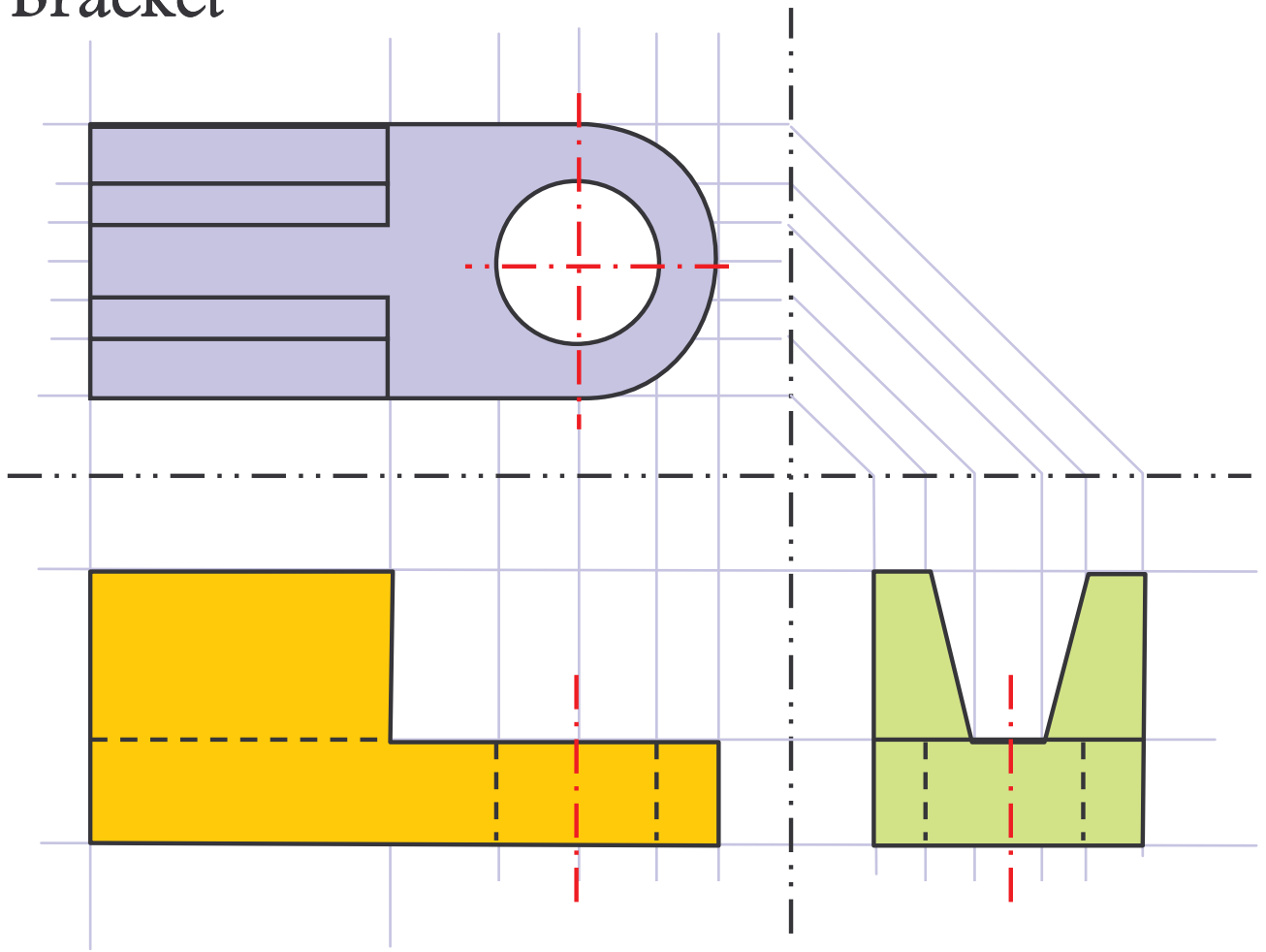
SIMPLE OBJECTS

- Embossed ramp…



SIMPLE OBJECTS

- Bracket



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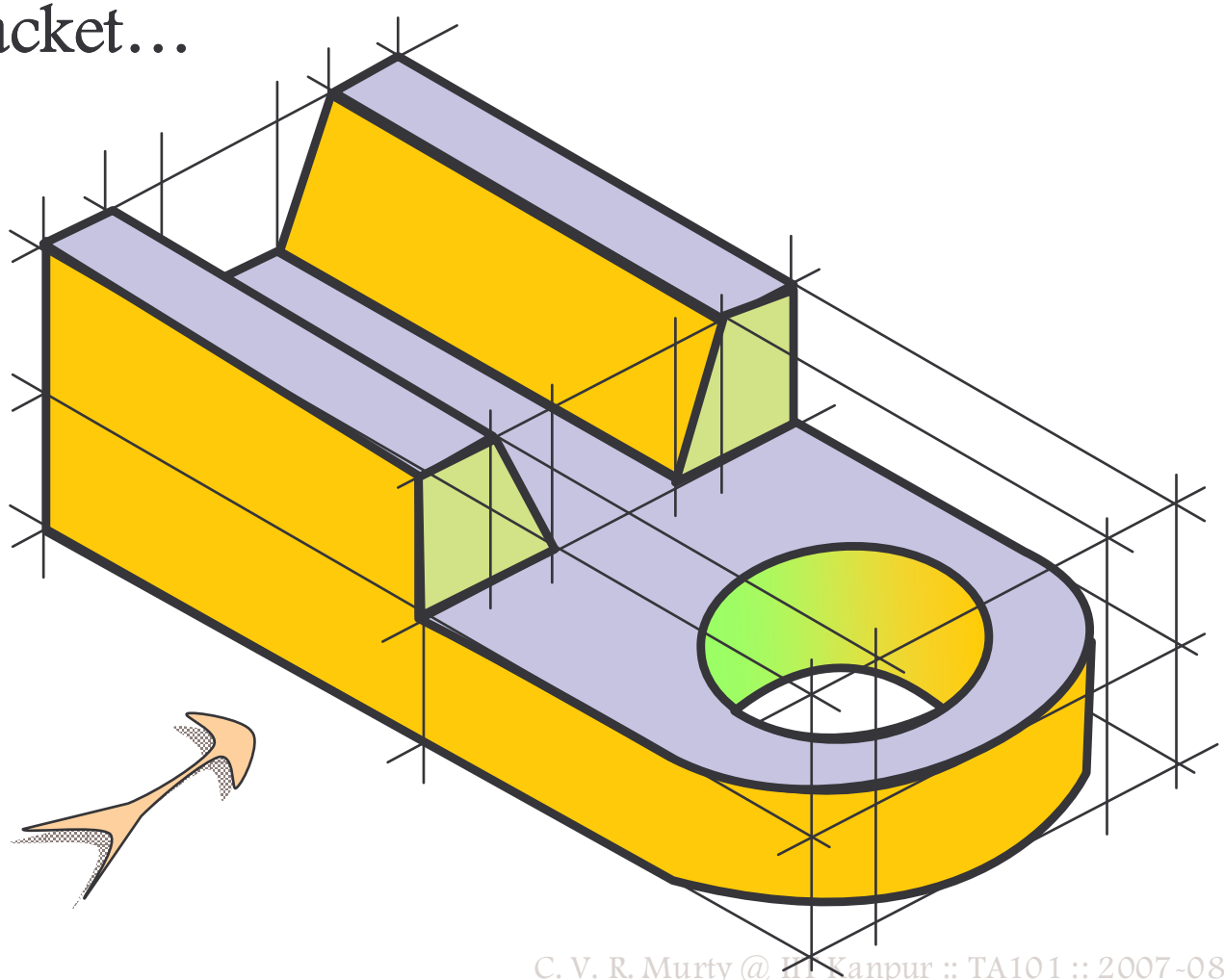
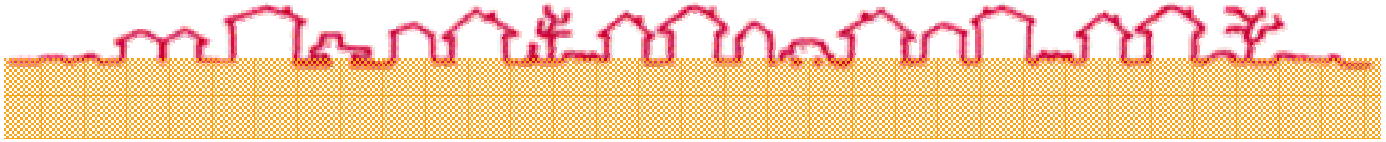
SIMPLE OBJECTS

- Bracket…





Have a Great Day!!