

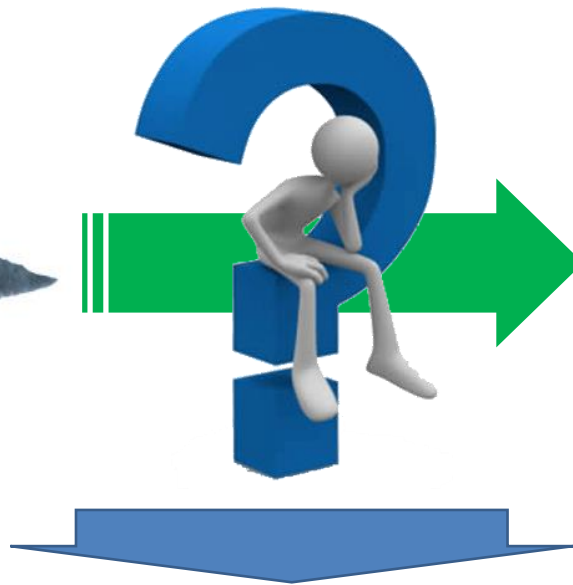
Fundamentos de desenho técnico mecânico

NORMAS DE DESENHO

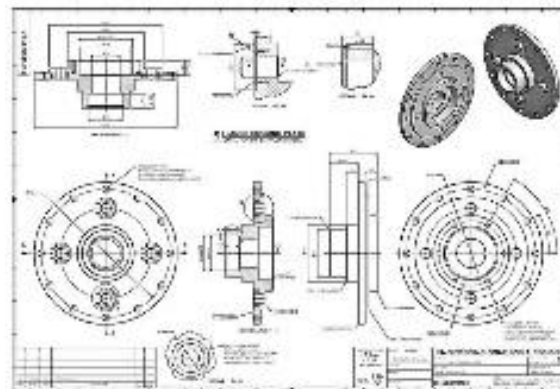
Como a matéria prima se transforma em produto?



Matéria prima

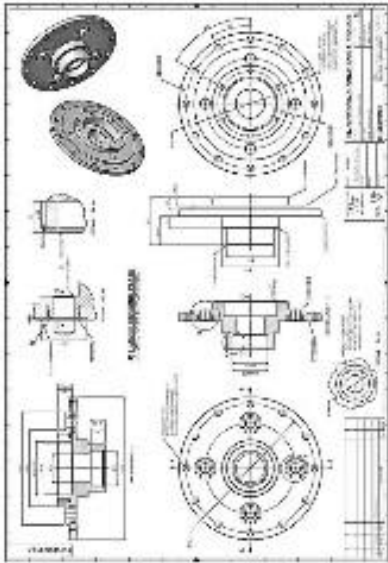


Produto

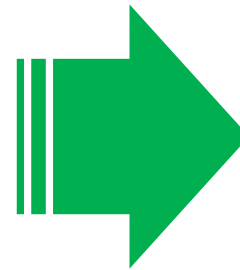


Projeto

Como um projeto se materializa?



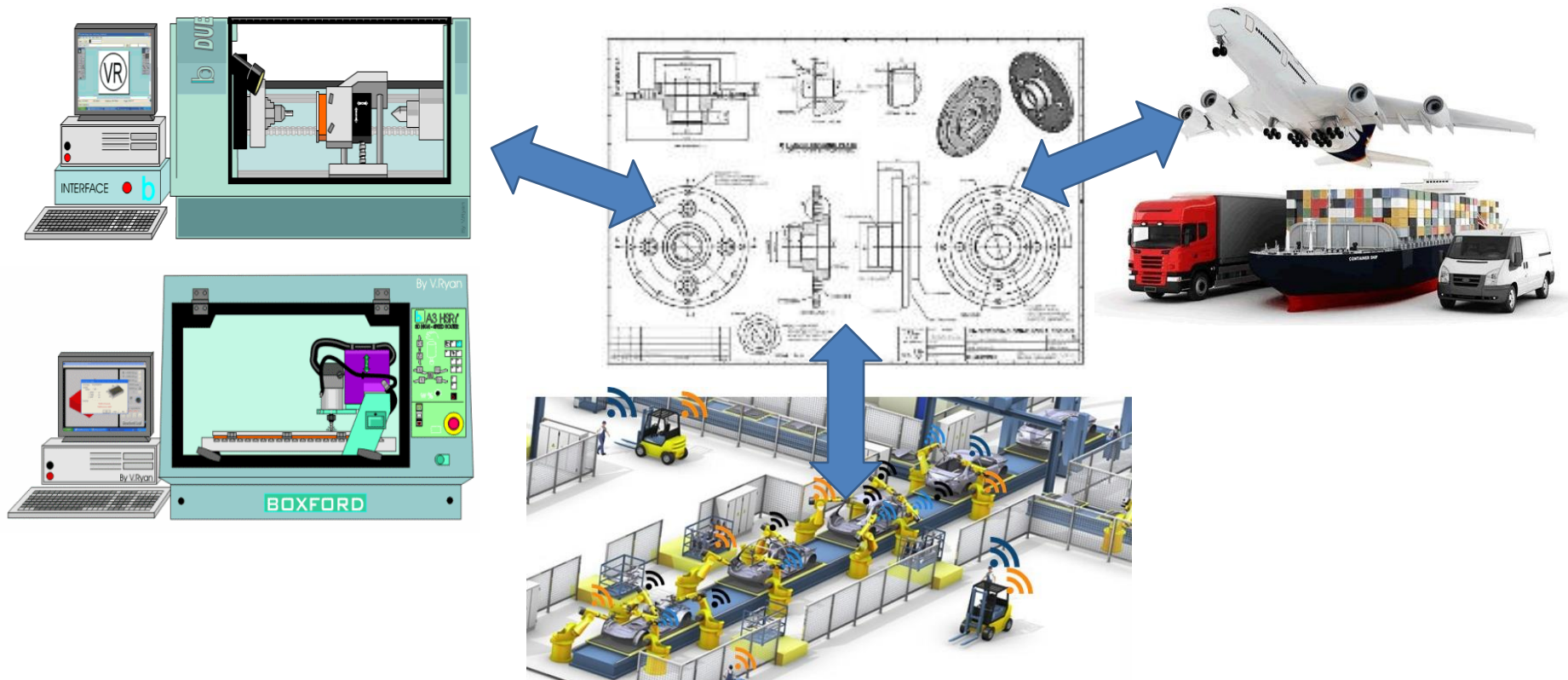
Projeto



Produto

Fabricação

Como fornecedores, fabricação e montagem se harmonizam?



O que a NORMALIZAÇÃO proporciona?



Que todos os envolvidos interpretem as informações técnicas da mesma forma

O que mais a NORMALIZAÇÃO proporciona?

- Redução de custo
- Racionalização de processos
- Intercambialidade
- Múltiplos fornecedores
- Qualidade
- Reprodutibilidade de informações
- Rastreabilidade da informação
- outros

Principais NORMAS utilizadas em desenho técnico mecânico e nesta disciplina

-  NBR 8403 - Aplicacao de linhas em desenhos - Tipos.pdf
-  NBR 8993 - Representacao e partes roscadas.pdf
-  NBR 10067 - Principios gerais de representacao em desenho tecnico.pdf
-  NBR 10126 - Cotagem de desenho tecnico.pdf
-  NBR-12298 - Hachuras.pdf



Todas estão disponíveis para download no drive da disciplina

Fundamentos de desenho técnico mecânico

(Revisão de geometria descritiva)

Tipos de linhas (NBR 8403)



A. Contínua larga

⇒ contornos visíveis e arestas visíveis



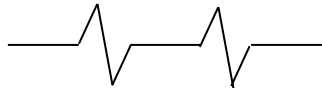
B. Contínua estreita

⇒ linhas de interseção imaginárias, linhas de cotas, linhas auxiliares, linhas de chamadas, hachuras, contornos de seções, rebatidas na própria vista



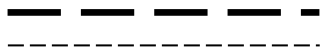
C. Contínua a mão livre

⇒ limites de vistas ou cortes parciais



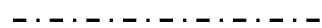
D. Contínua com zig-zag

⇒ Linhas de ruptura, desenhos grandes



E. Tracejada larga ou fina

⇒ Contornos não visíveis e arestas não visíveis



F. Traço-ponto estreita

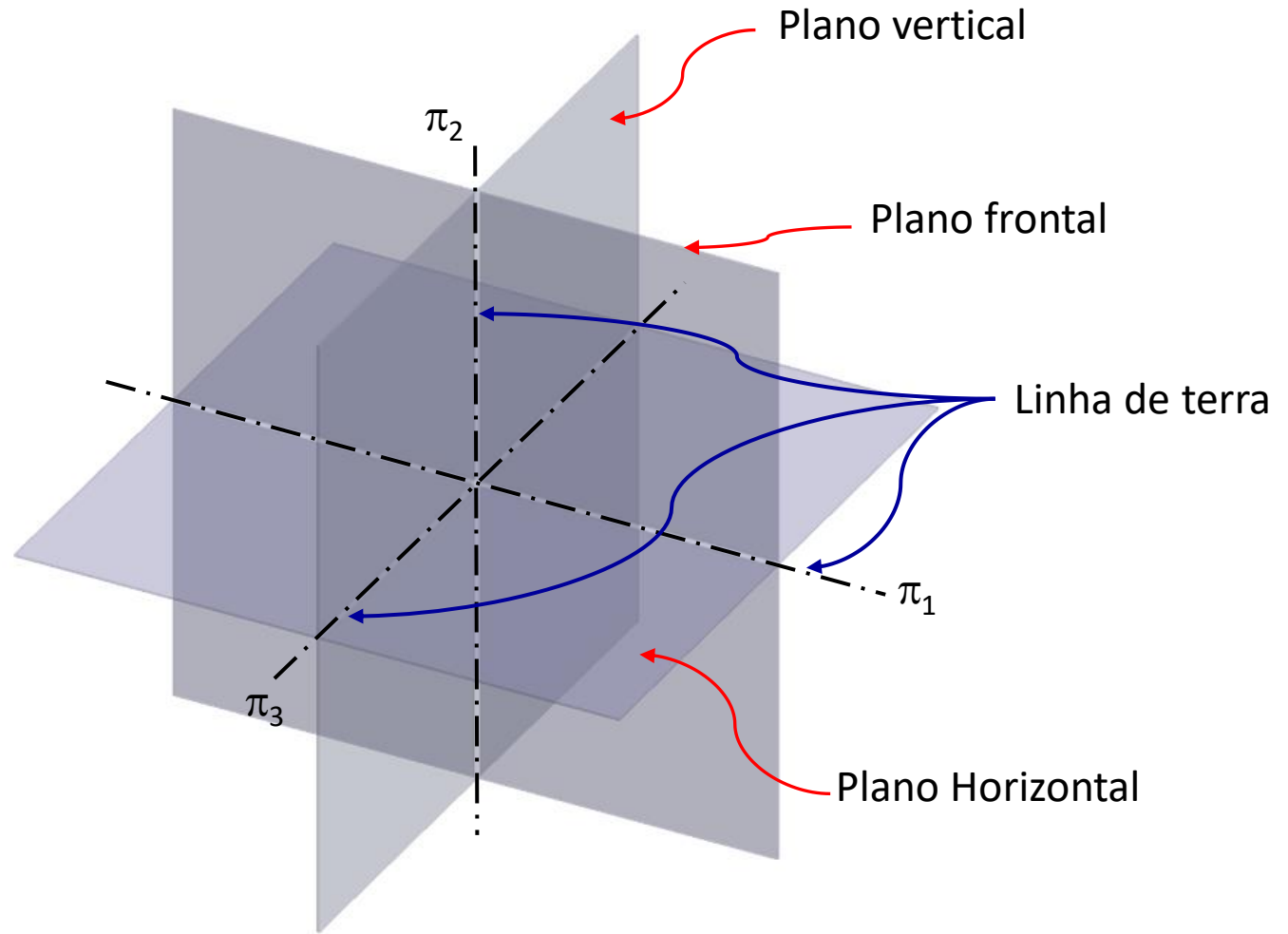
⇒ Linhas de centro, linhas de simetrias



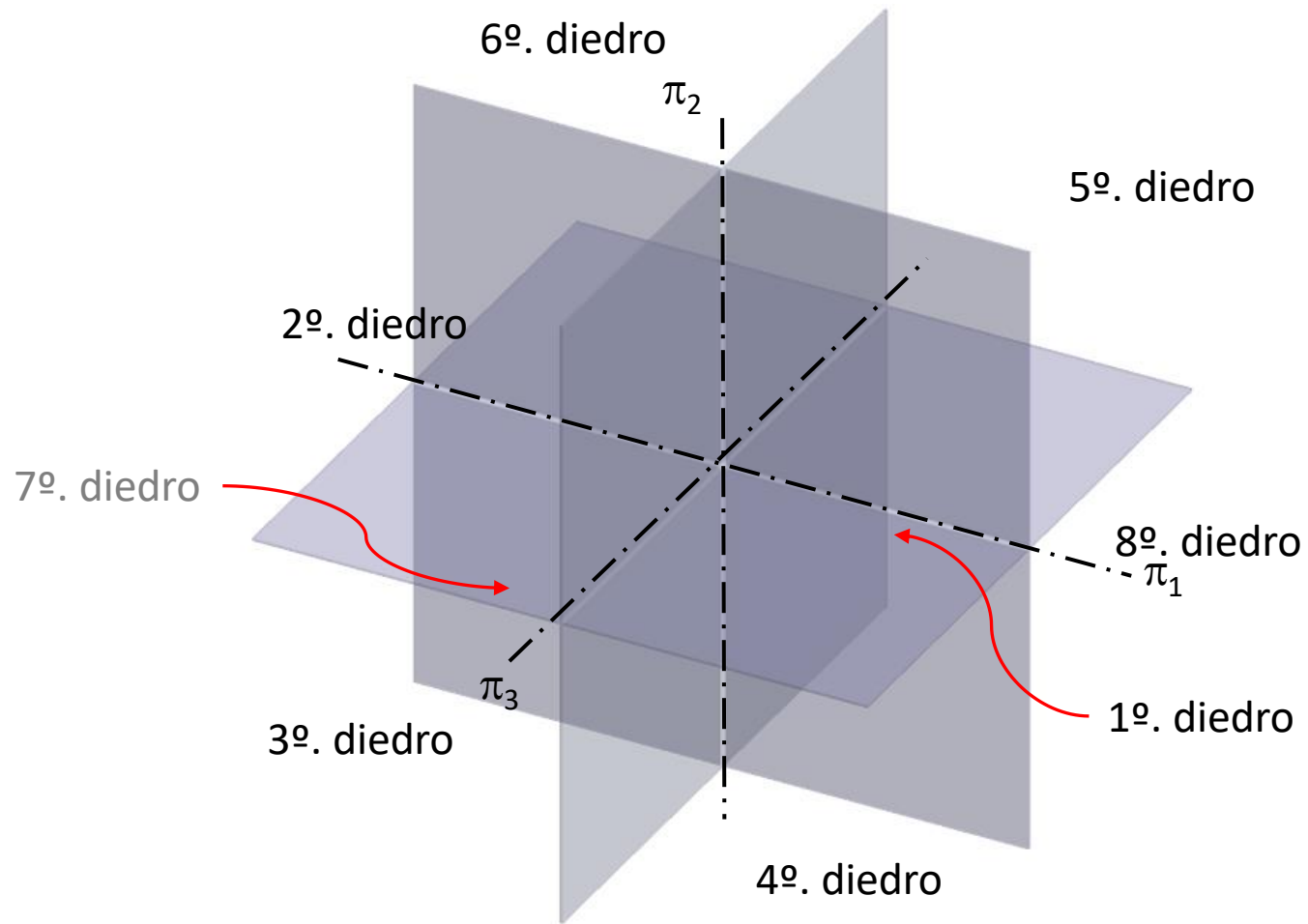
G. Traço-ponto larga nas extremidades

⇒ Planos de corte

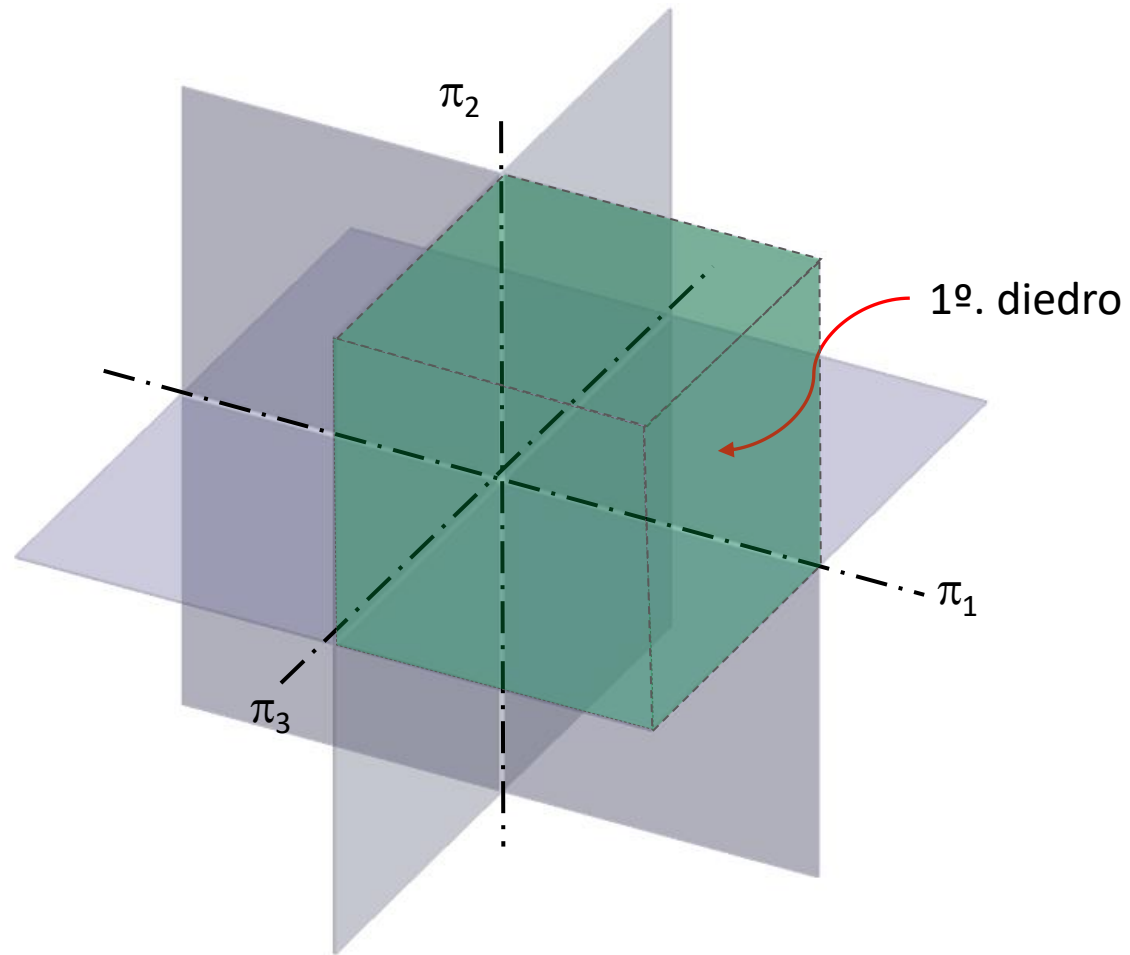
➤ Planos ortogonais



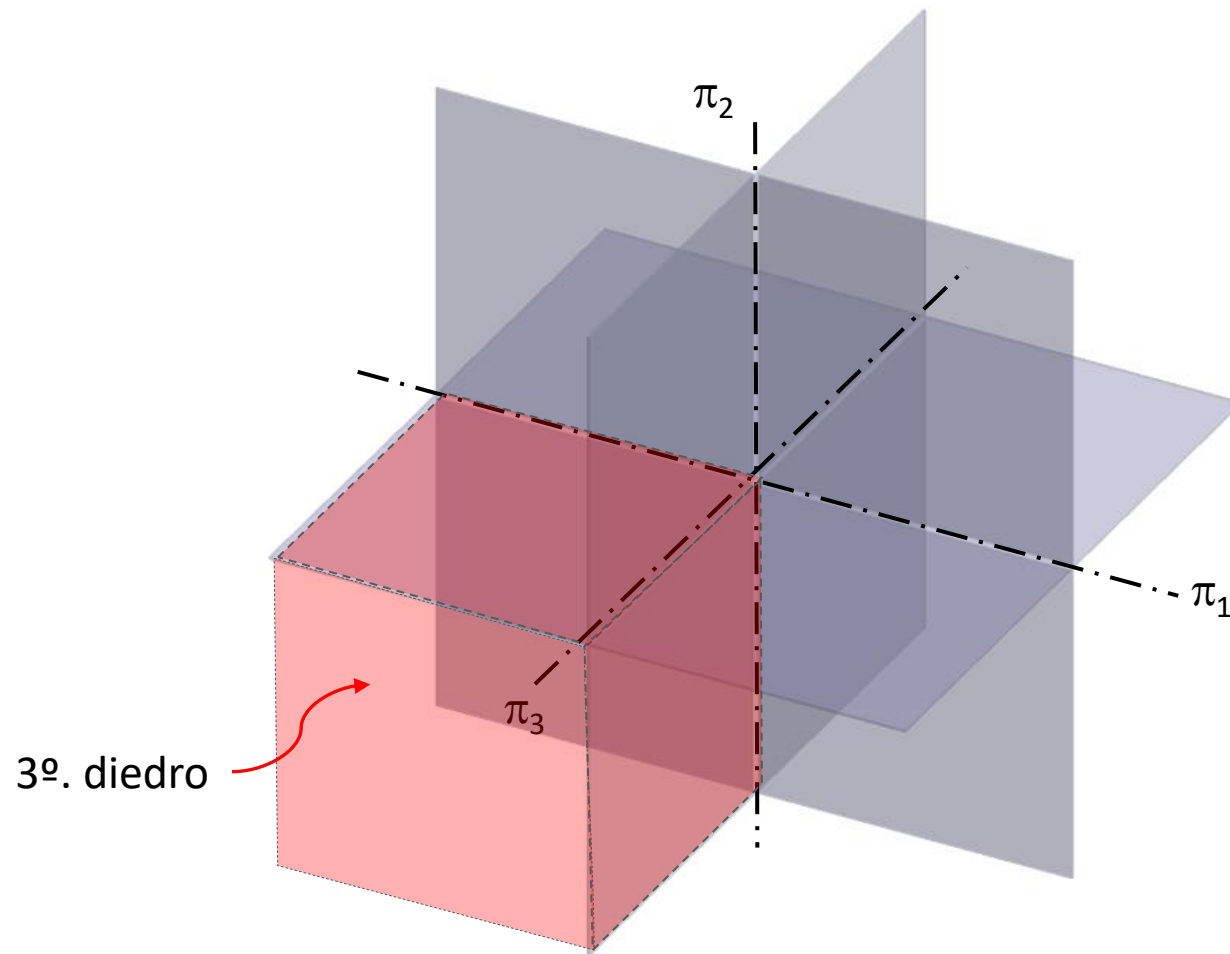
➤ Diedros



➤ Diedros

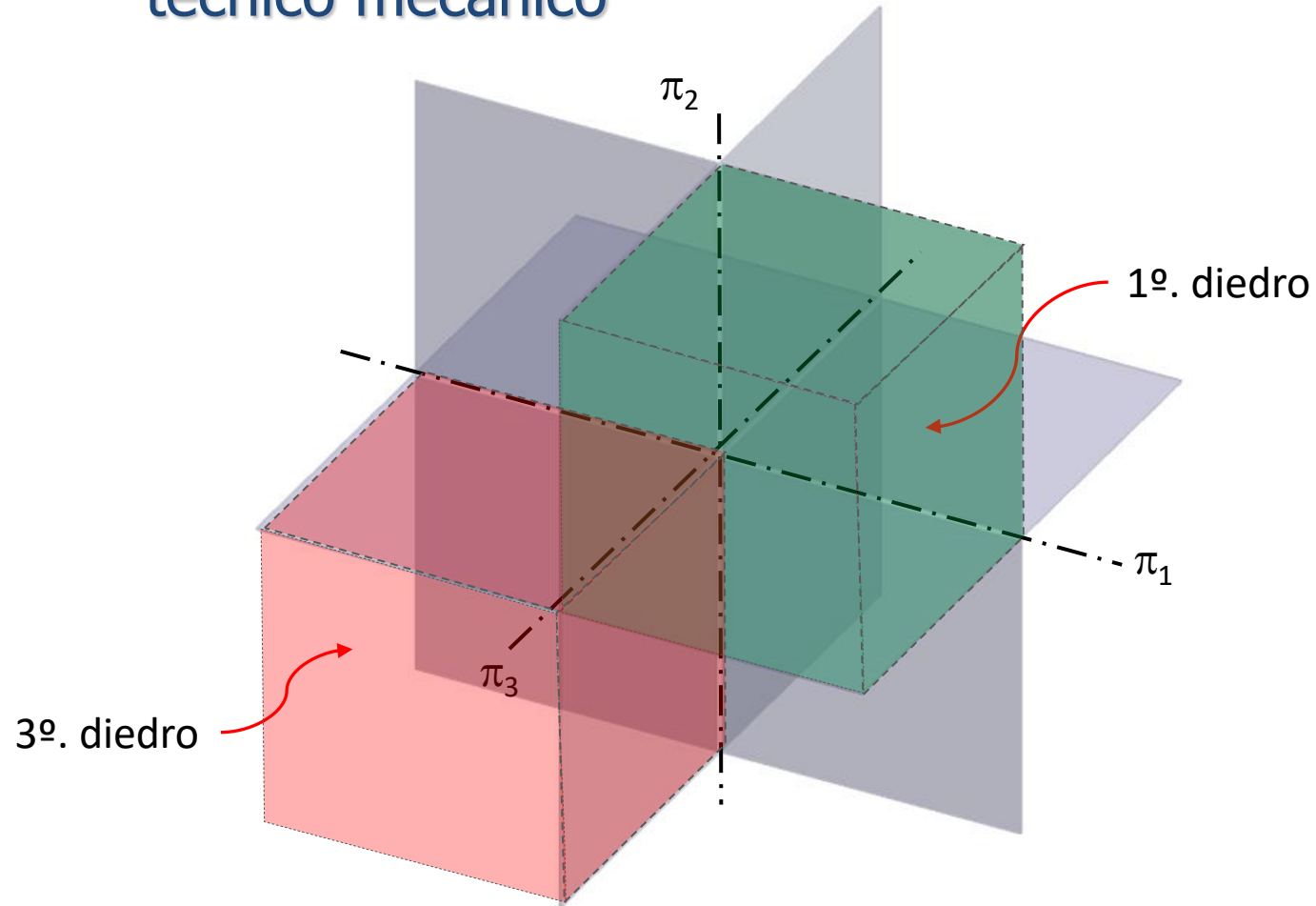


➤ Diedros

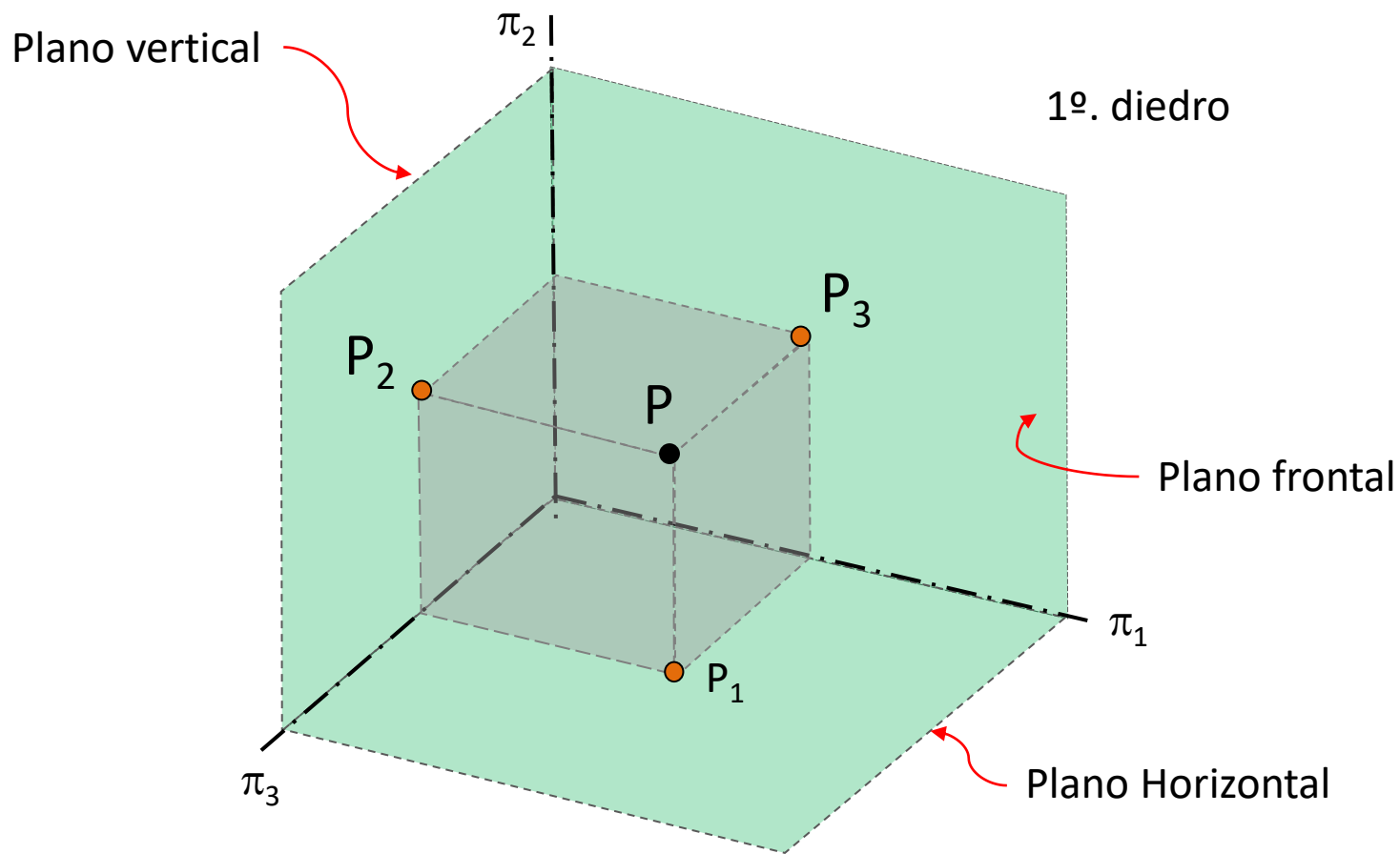


➤ Diedros

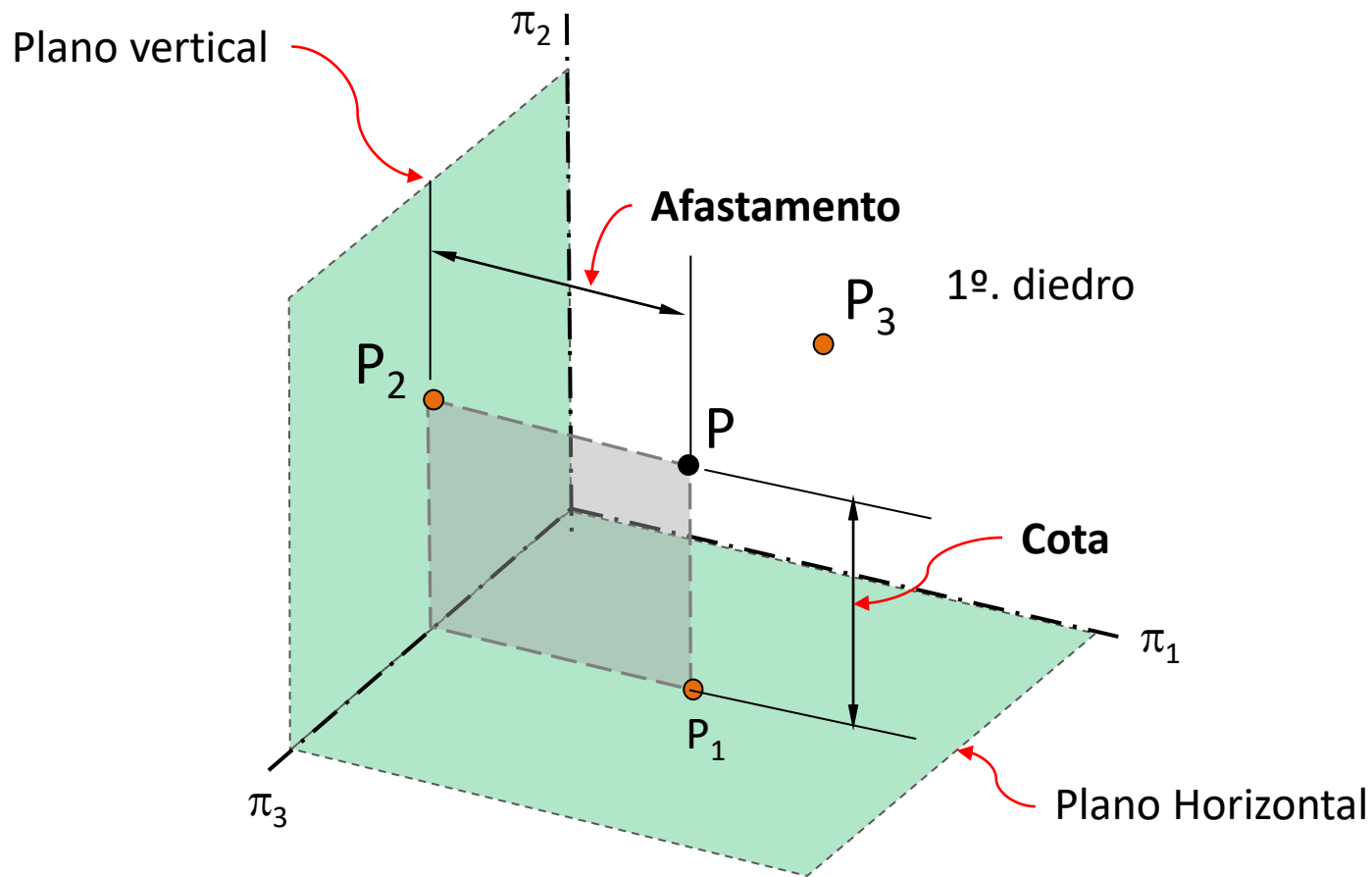
- ✓ Esses são os principais diedros em desenho técnico mecânico



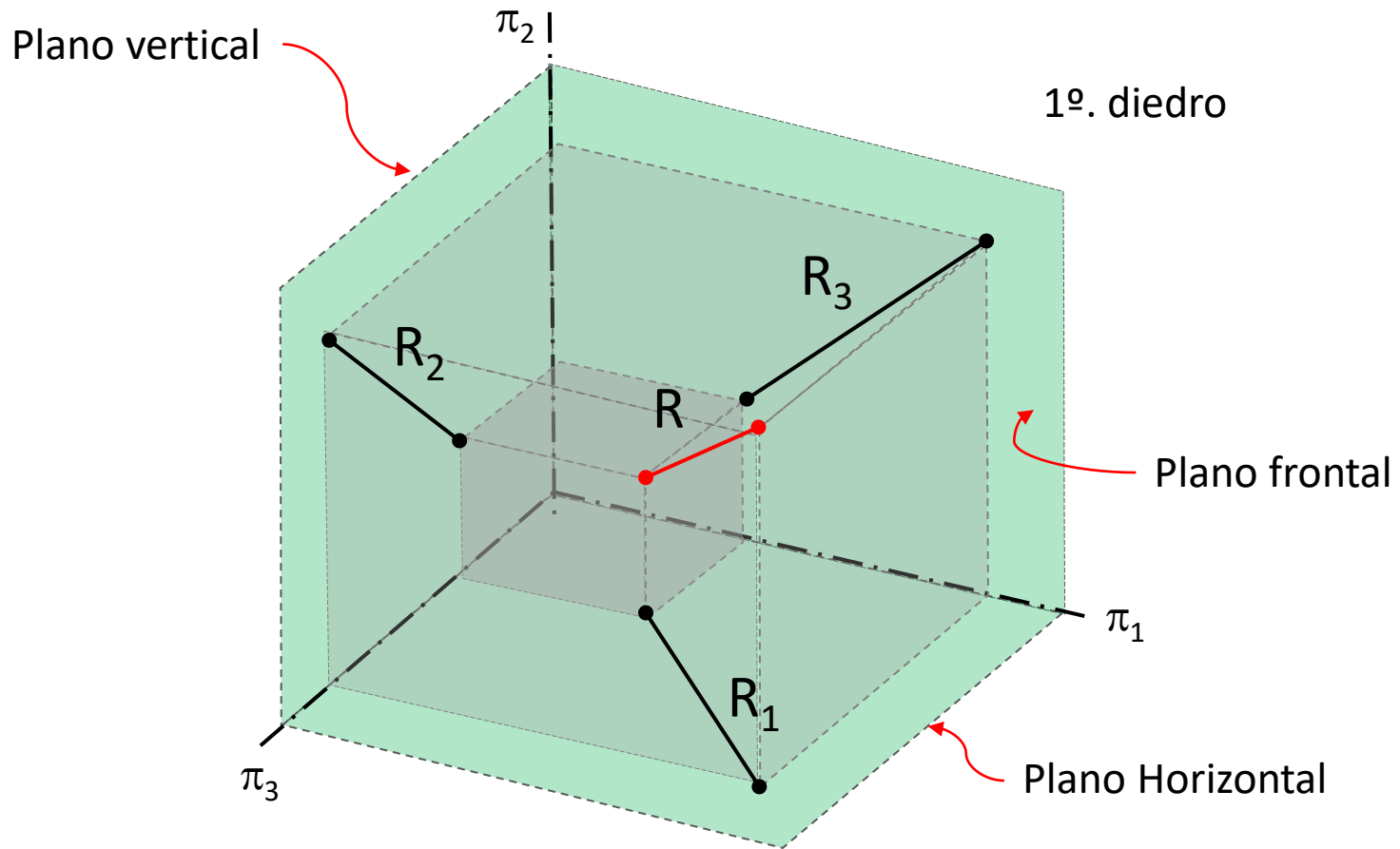
➤ Projeção do ponto



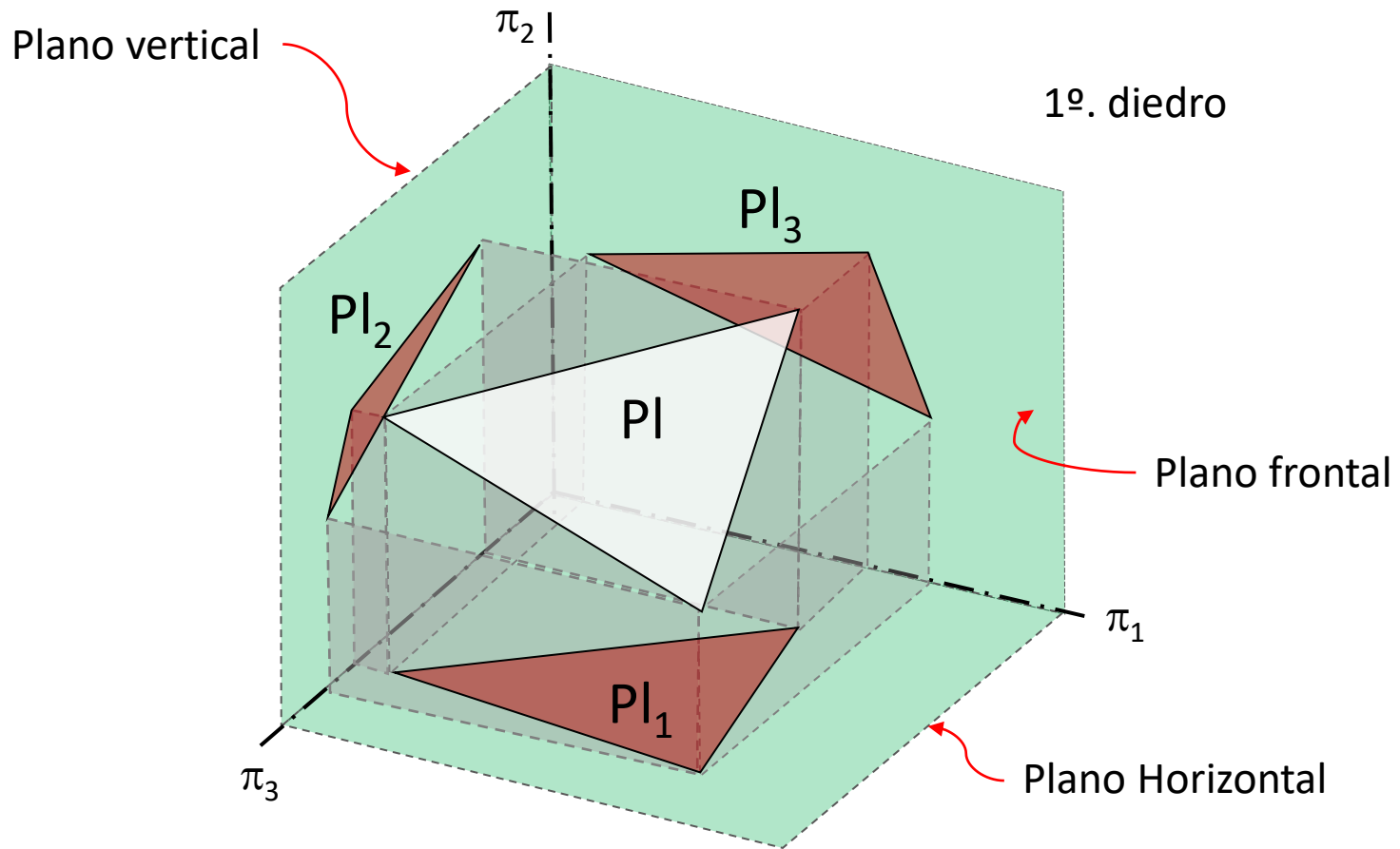
➤ Projeção do ponto



➤ Projeção da reta

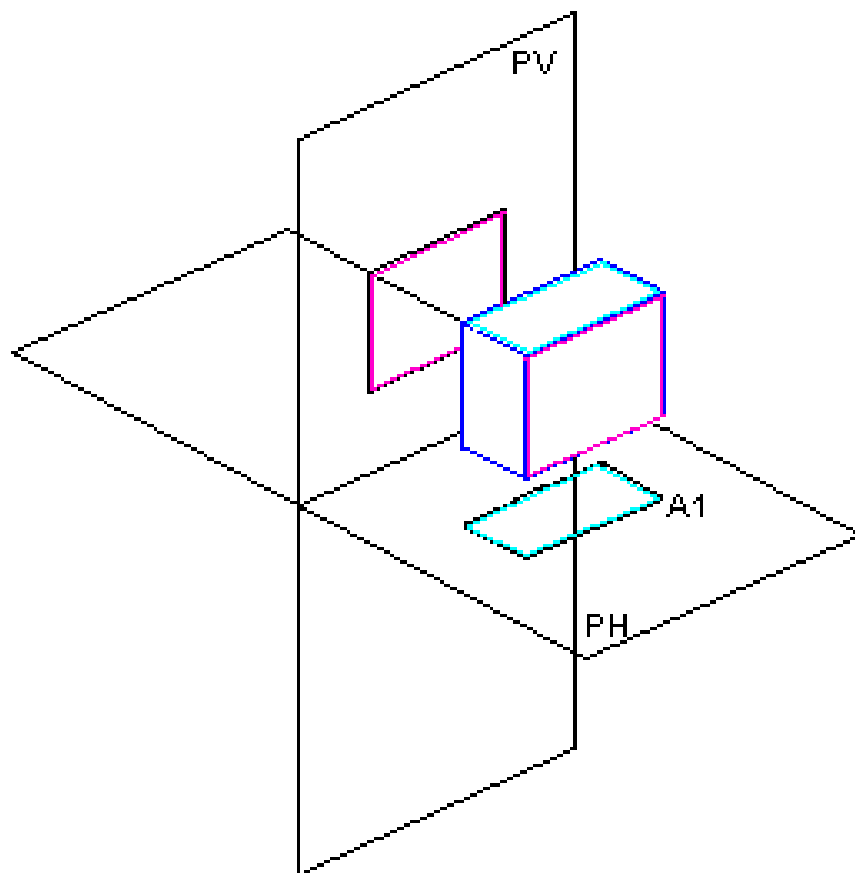


➤ Projeção do plano

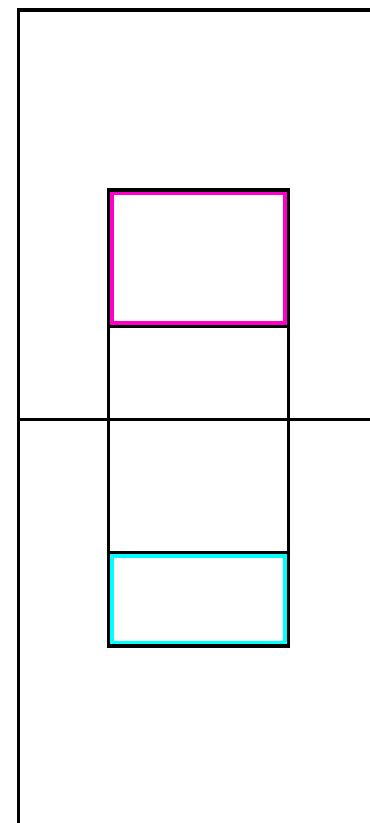


➤ Projeção do sólido

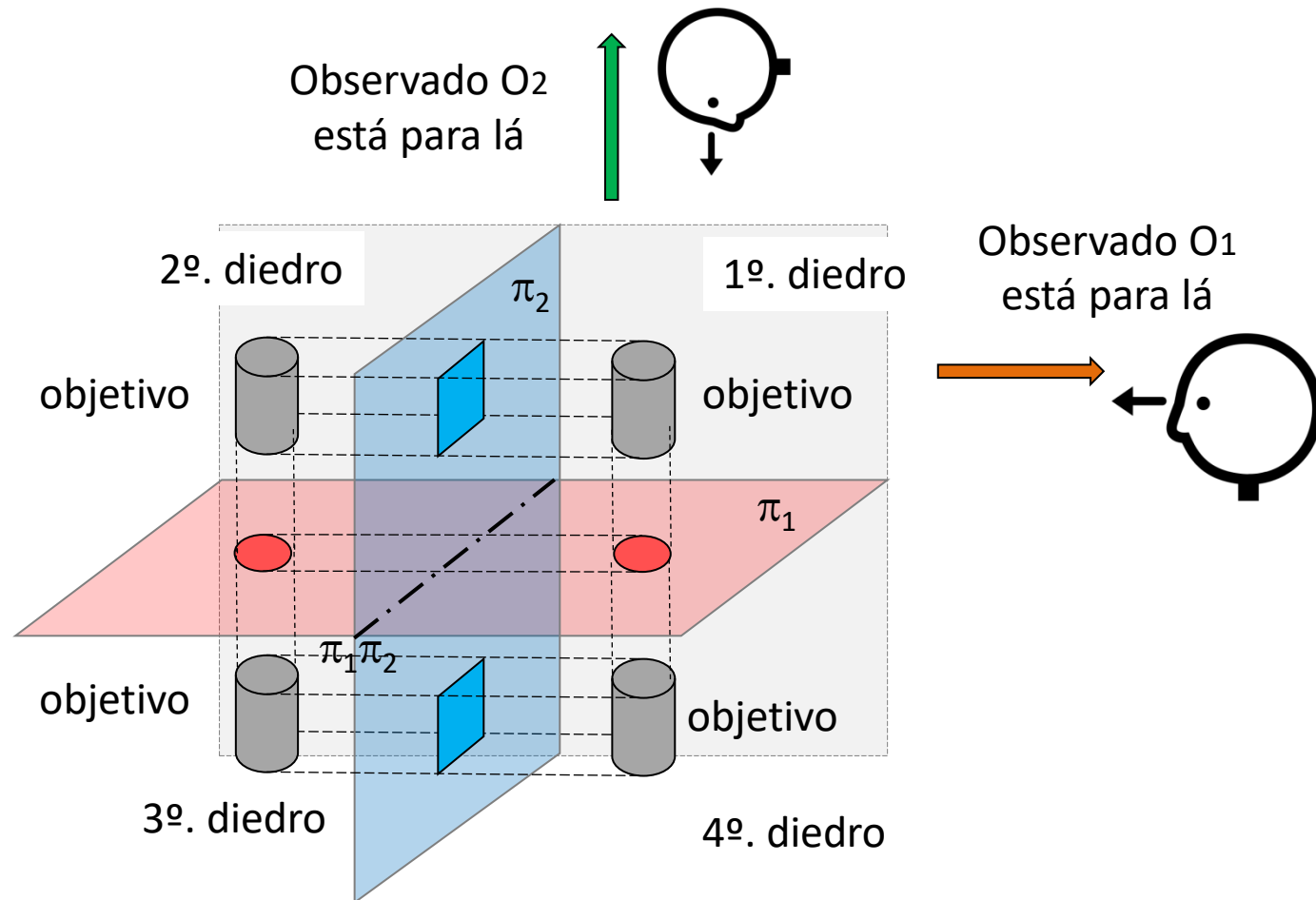
1º DIEDRO



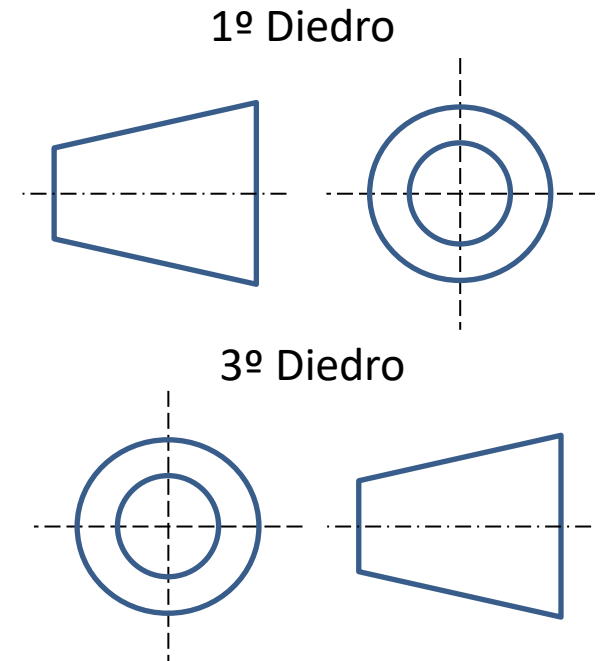
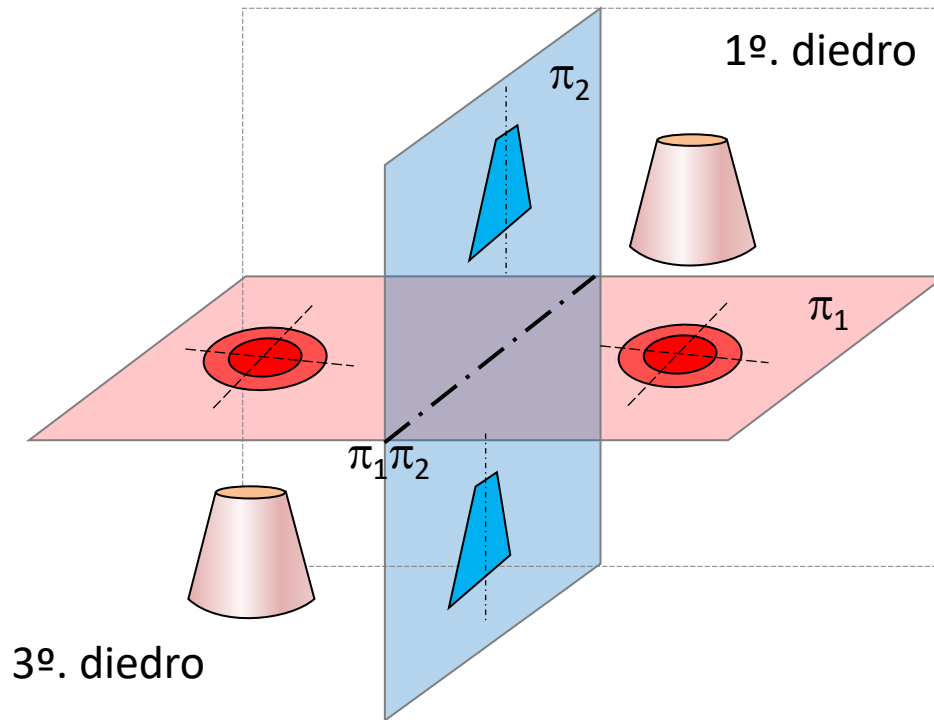
ÉPURA



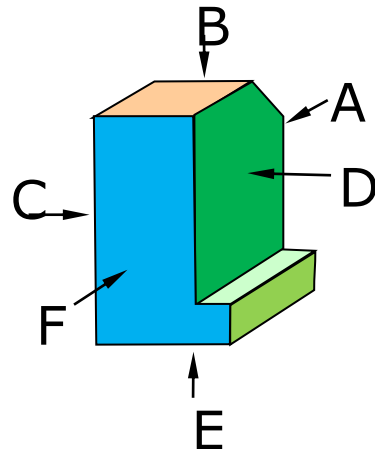
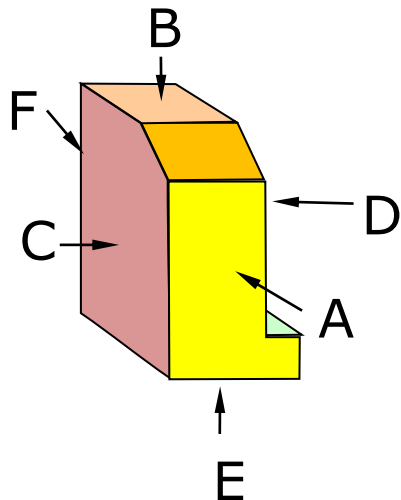
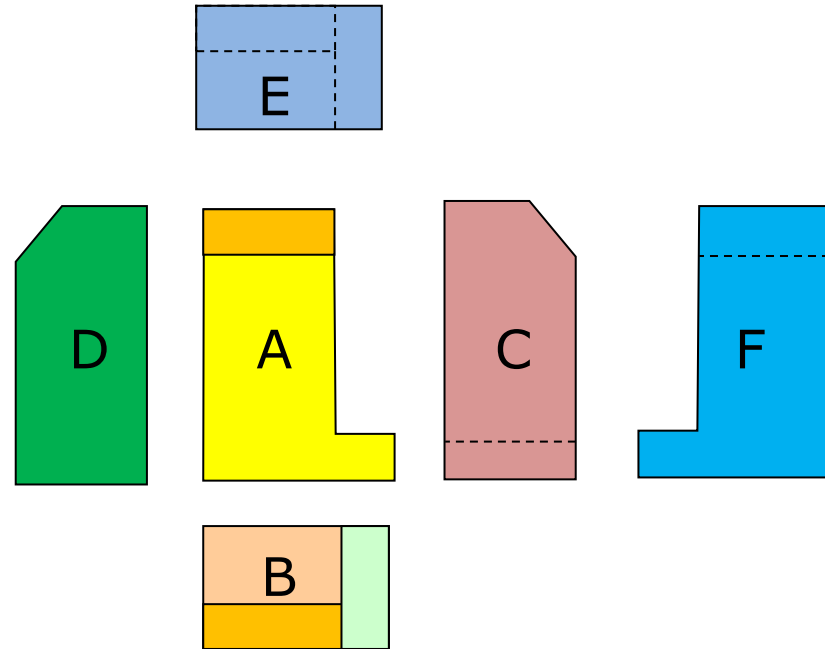
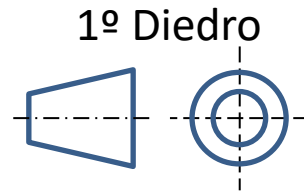
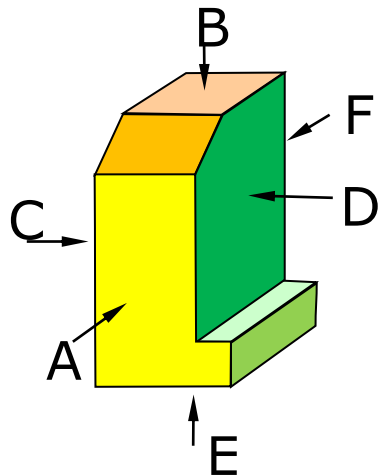
➤ Projeções ortogonais nos 4 diedros



➤ Projeções ortogonais



➤ Projeção no 1º diedro (NBR 10067)



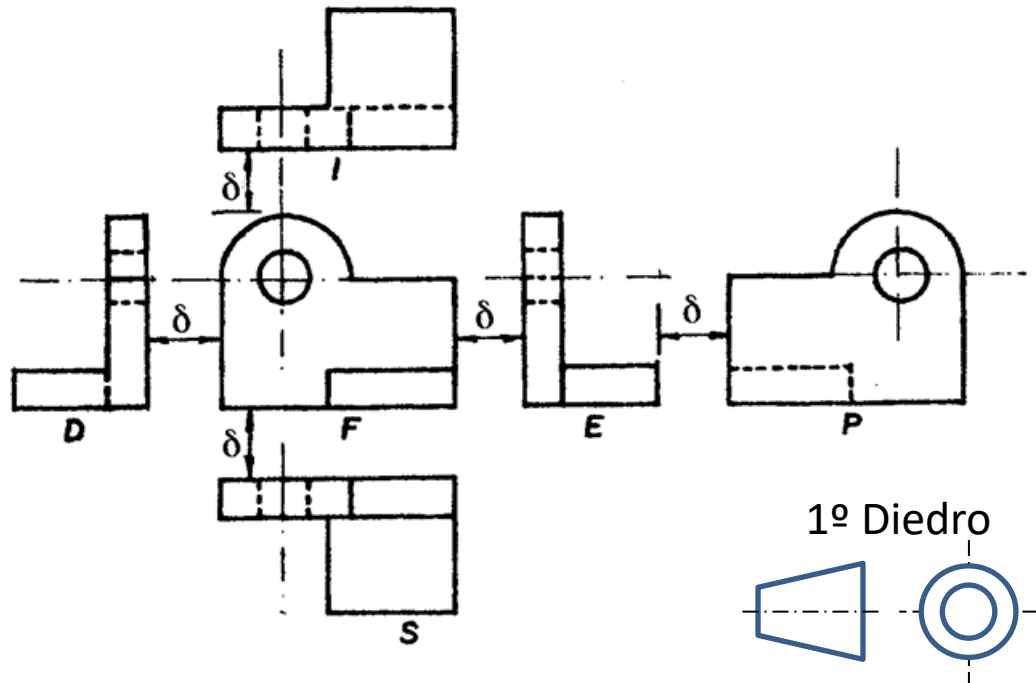
Onde:

- ⇒ A – vista frontal (VF)
- ⇒ B – vista superior (VS)
- ⇒ C – vista lateral esquerda (VLE)
- ⇒ D – vista lateral direita (VLD)
- ⇒ E – vista inferior (VI)
- ⇒ F – vista posterior (VP)

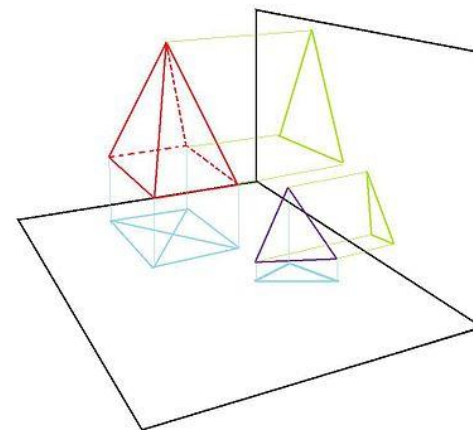
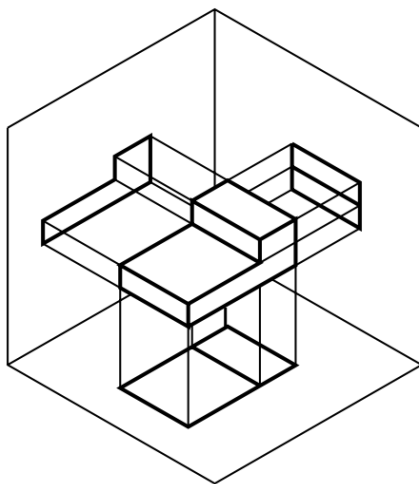
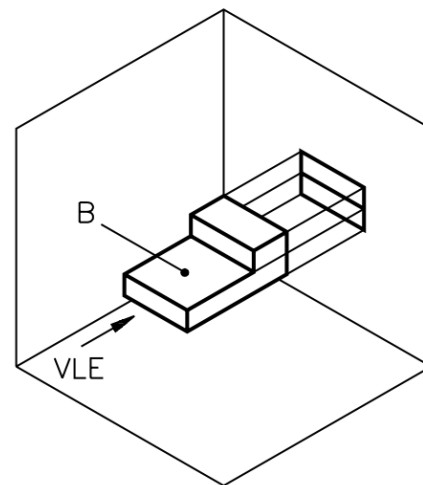
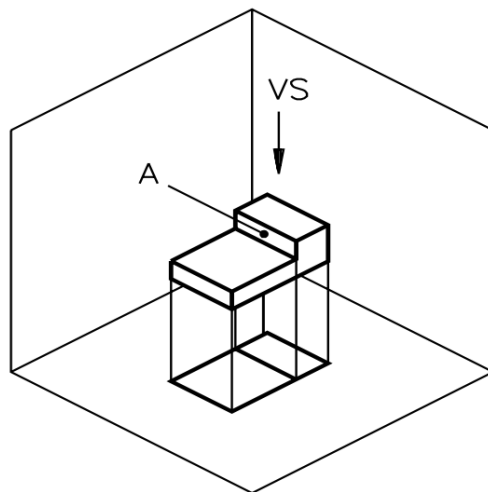
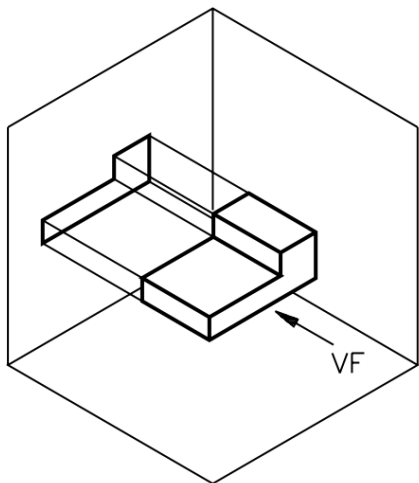
➤ Pontos importantíssimos

O desenho das vistas devem obedecer:

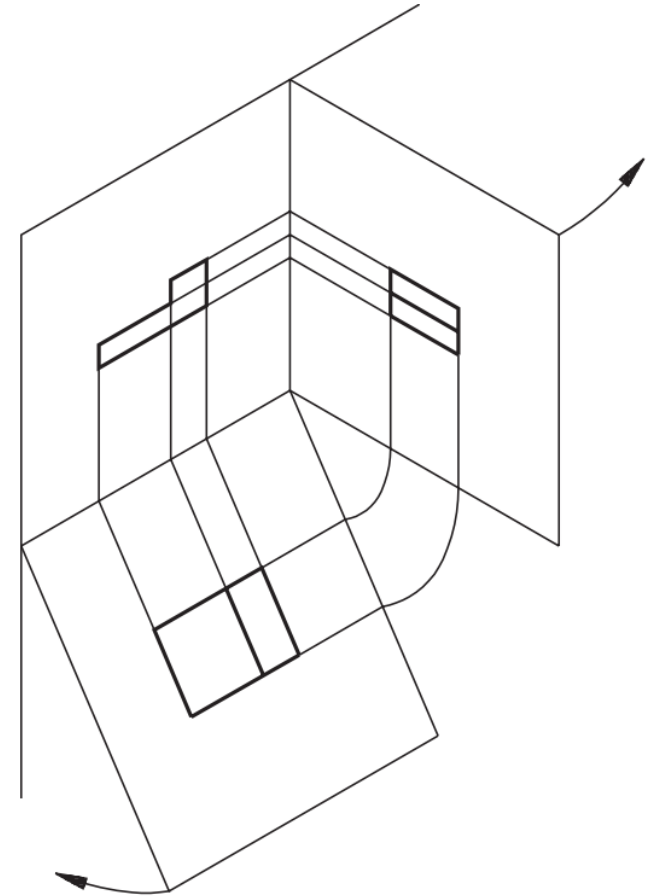
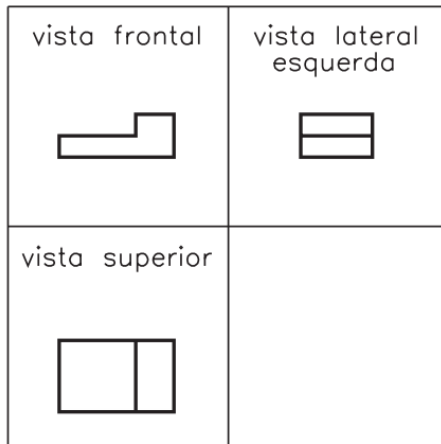
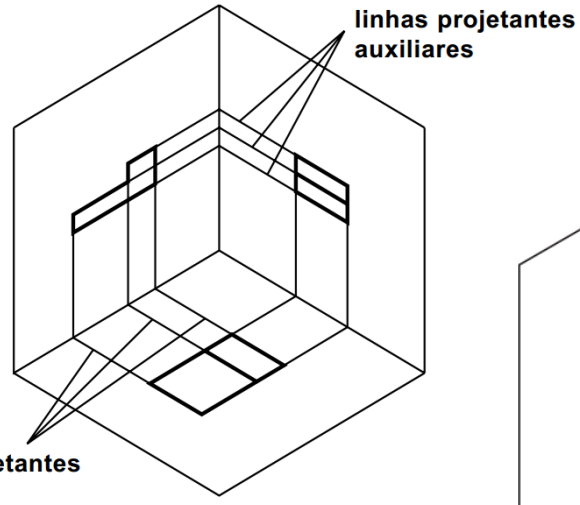
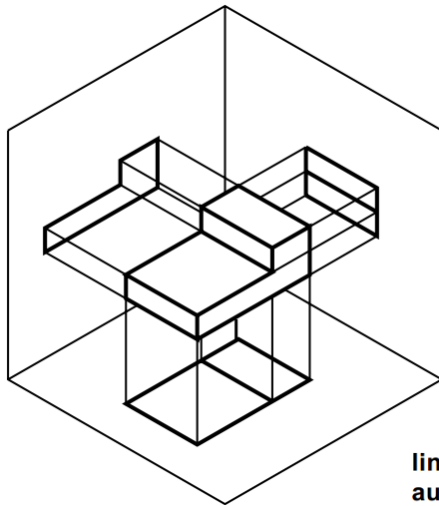
- ⇒ Posicionamento;
- ⇒ Alinhamento;
- ⇒ Espaçamento.



➤ Vistas ortogonais

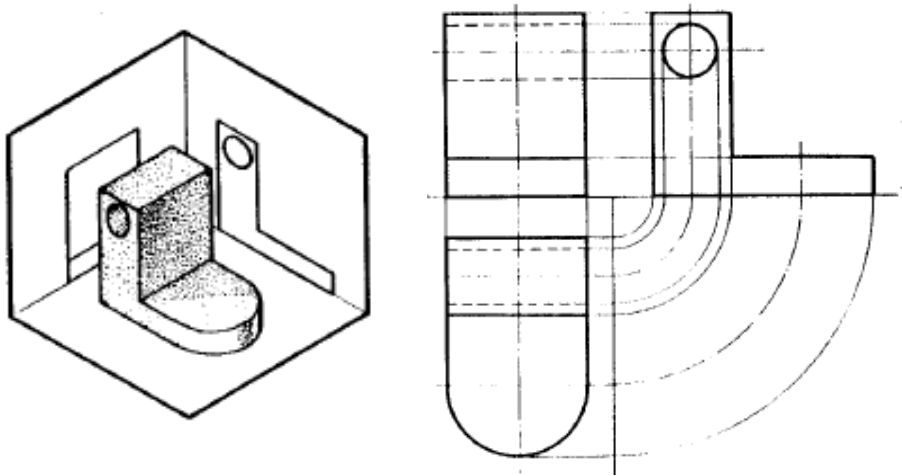


➤ Vistas ortogonais

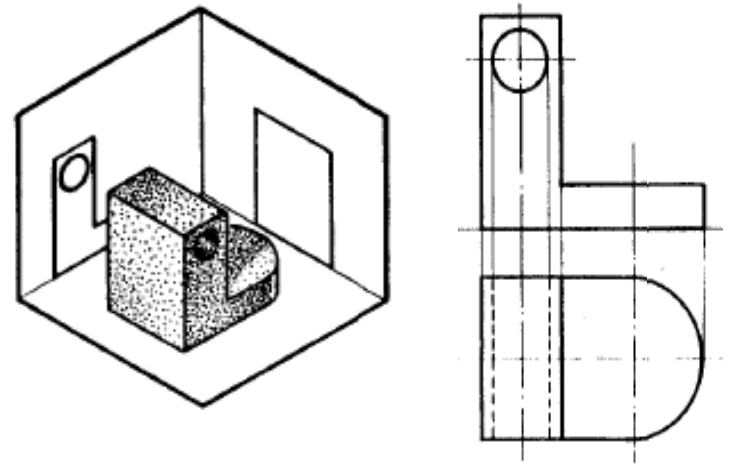


➤ Vistas ortogonais

As vistas devem ser apenas as necessárias e suficientes.

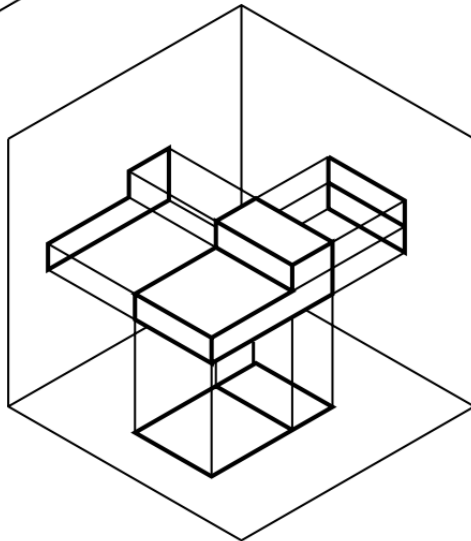
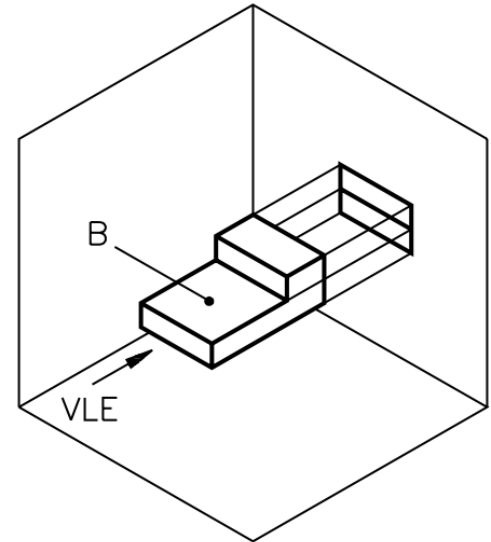
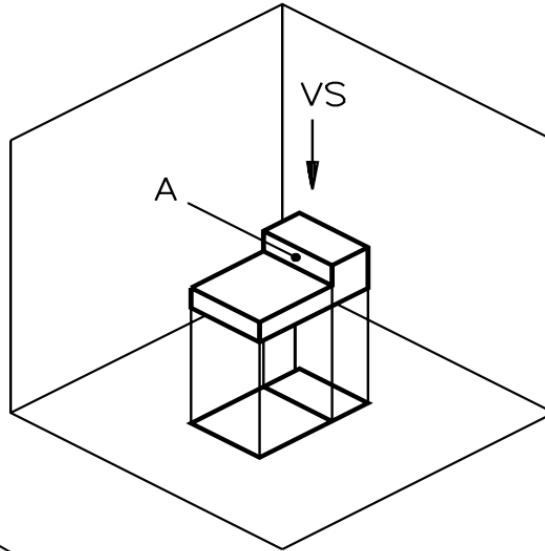
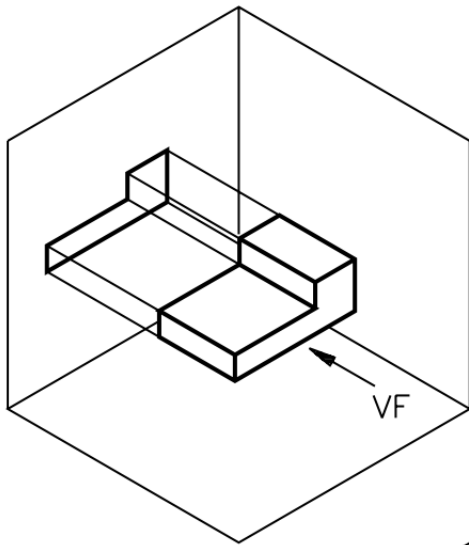


Para representar a peça nesta posição, são necessárias três vistas.

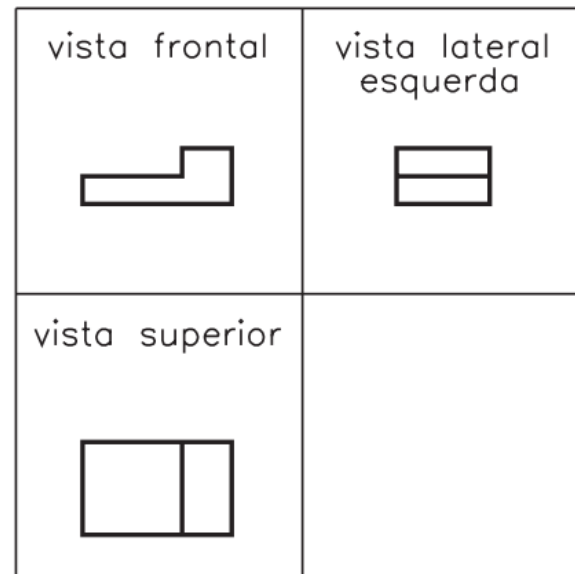
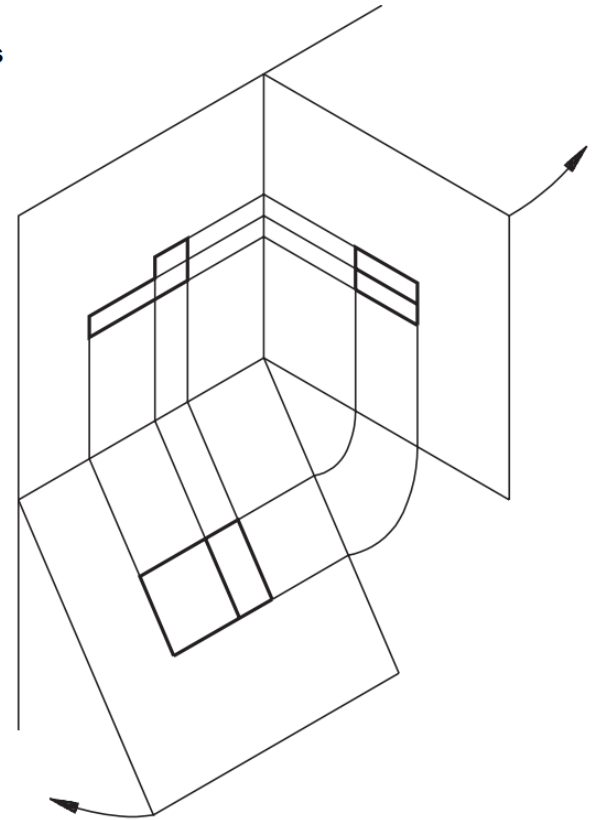
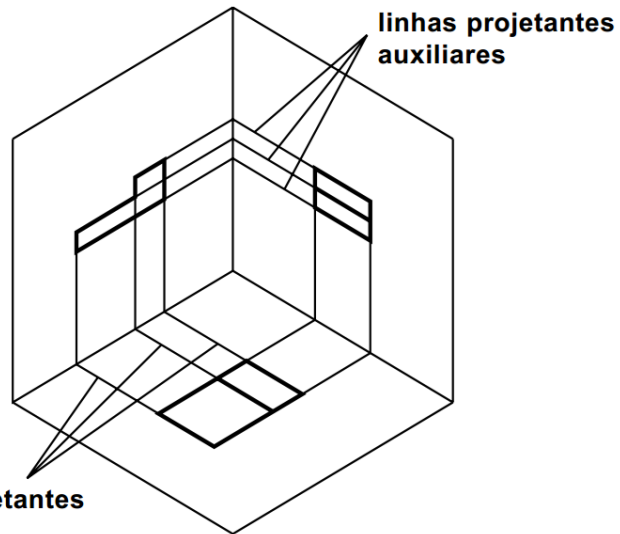
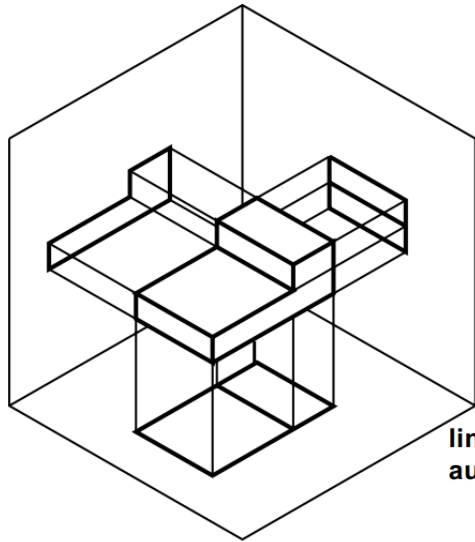


Nesta posição, são suficientes apenas duas vistas.

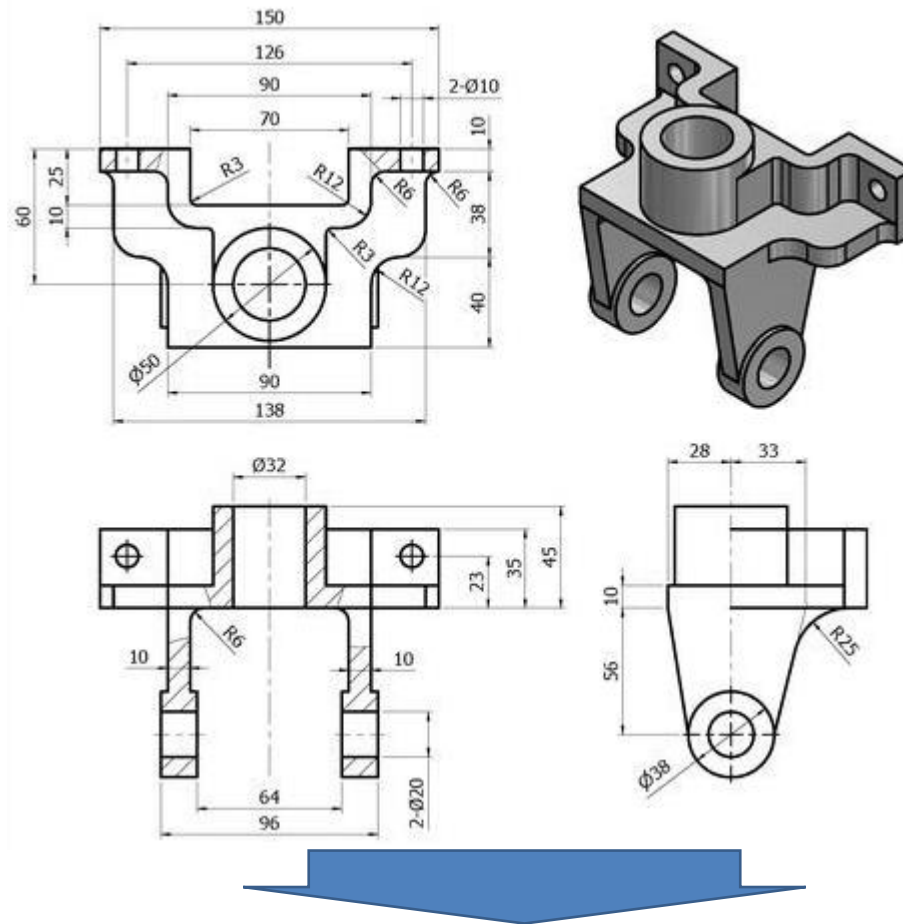
Fazendo vistas ortográficas



Fazendo vistas ortográficas

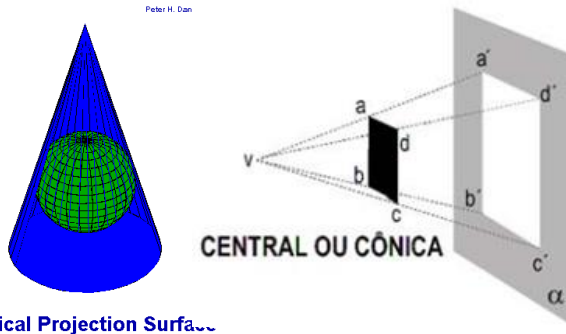
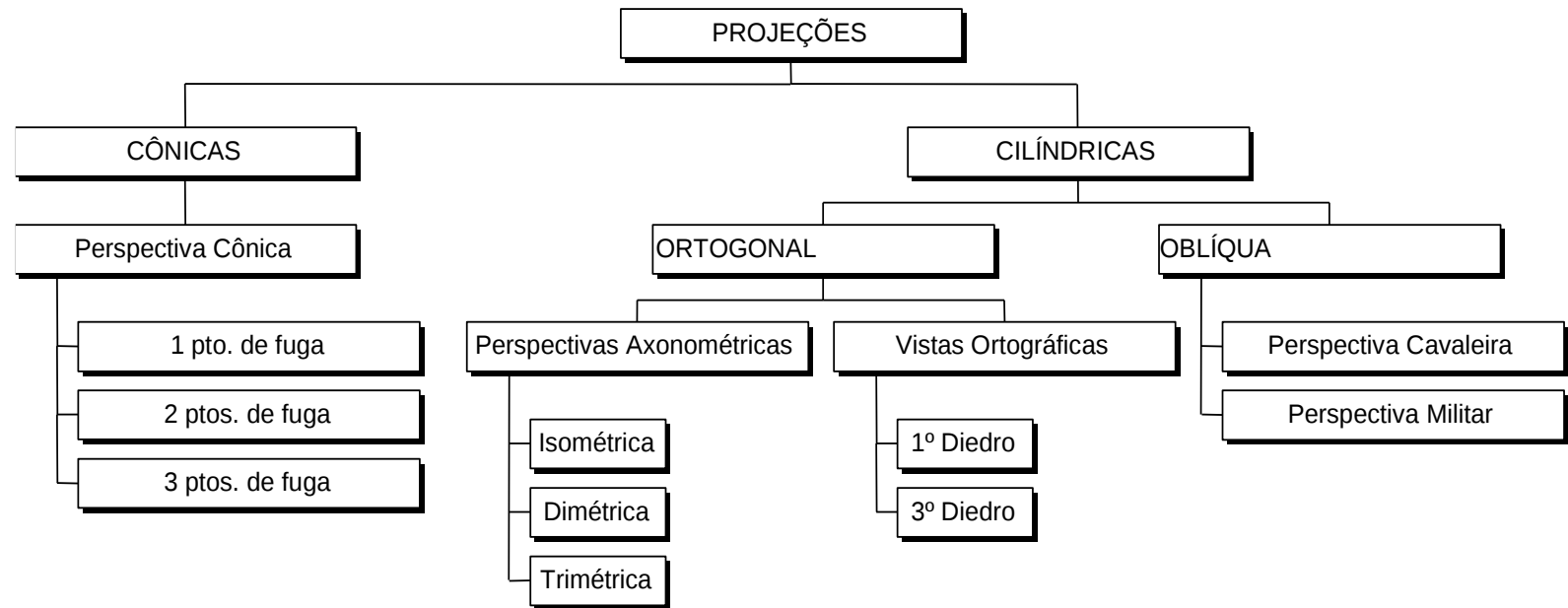


➤ Perspectivas



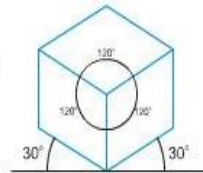
Além das projeções ortogonais as perspectivas permite uma visão tridimensional, permitindo observar detalhes ou características específicas do objeto

➤ Classificação das Projeções e Perspectivas

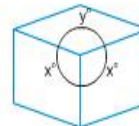


Conical Projection Surface

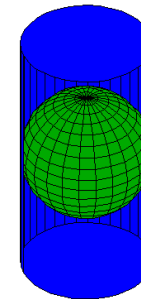
ISOMÉTRICA



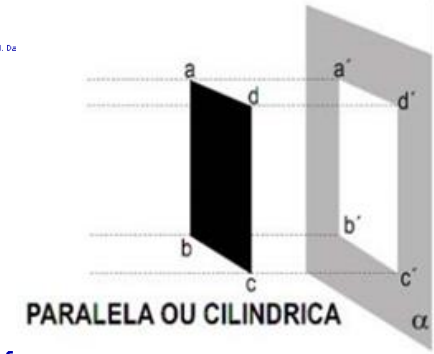
DIMÉTRICA



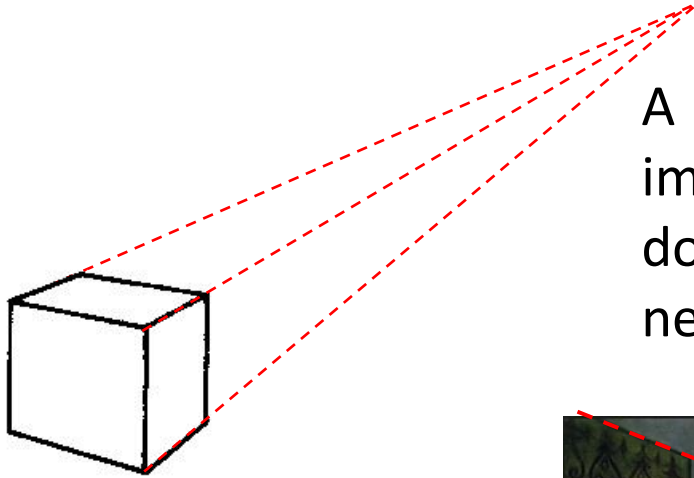
TRIMÉTRICA



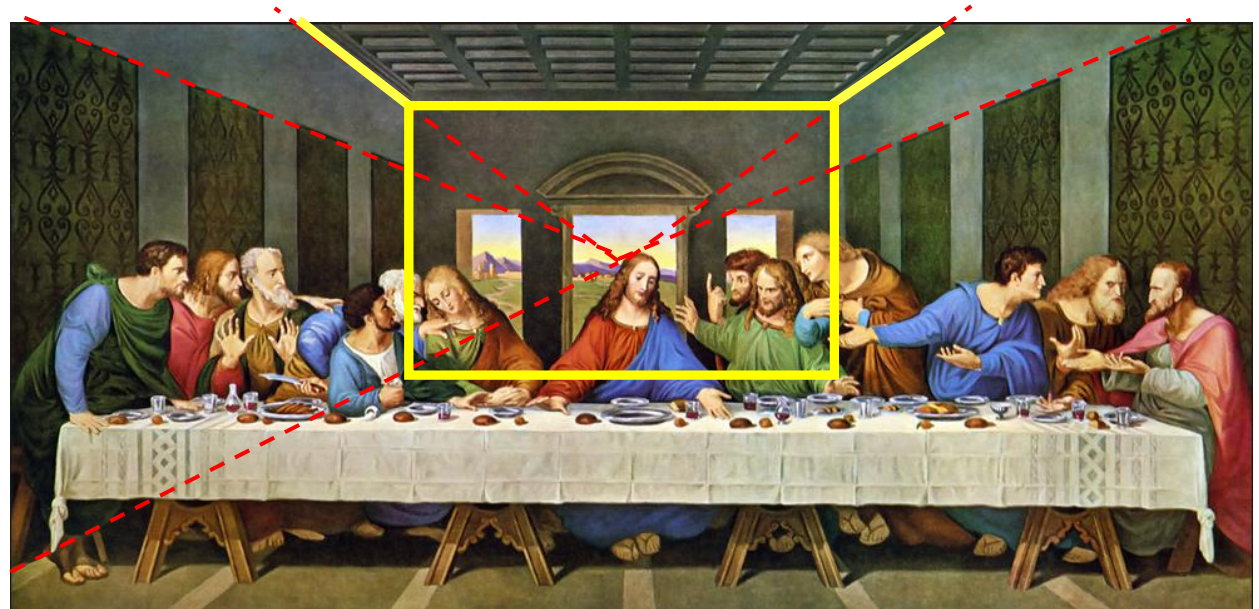
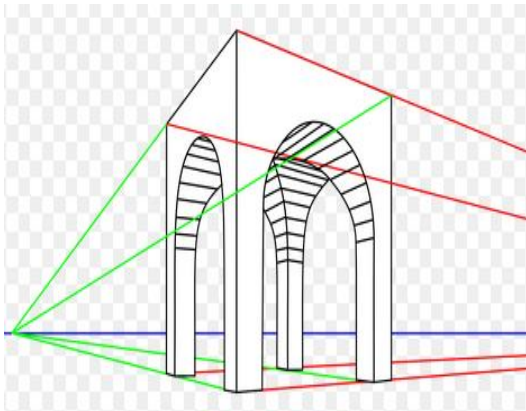
Cylindrical Projection Surface



➤ Projeções cônica



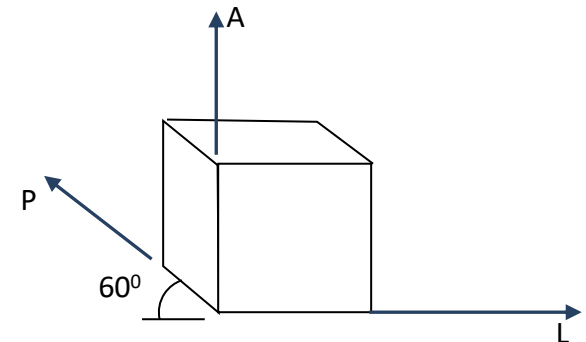
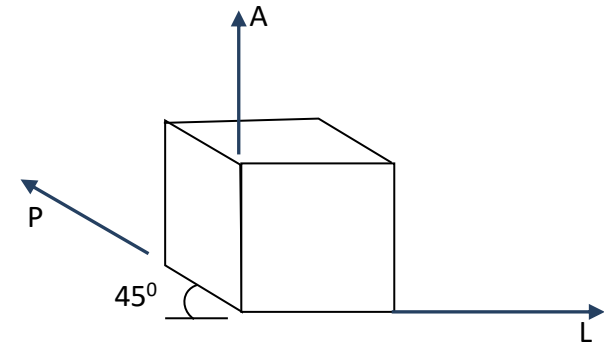
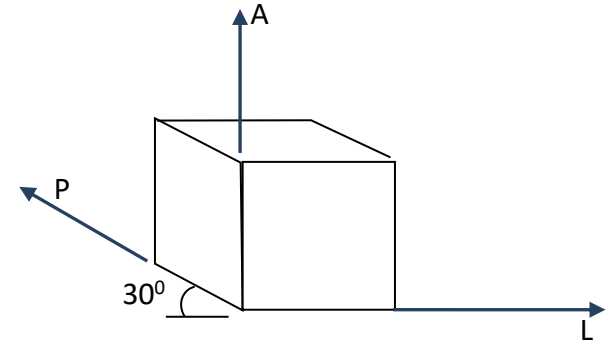
A projeção cônica é utilizada por ter uma imagem mais real do objeto. Pode ter um, dois ou três pontos de fuga, com duas ou nenhuma das direções dominantes paralelas.



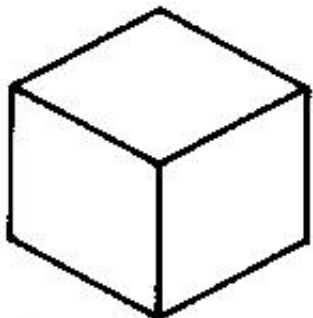
➤ Projeções cilíndrica oblíqua

Nessa perspectiva, os eixos da altura e largura formam entre si um ângulo reto, com as medidas mantendo suas verdadeiras grandezas. Já para a profundidade, o eixo está inclinado e suas medidas sofrem certa deformação.

TIPOS	COEFICIENTE DE REDUÇÃO DAS ESCALAS DOS EIXOS		
	L	A	P
CAVALEIRA 30°	1	1	2/3
CAVALEIRA 45°	1	1	1/2
CAVALEIRA 60°	1	1	1/3



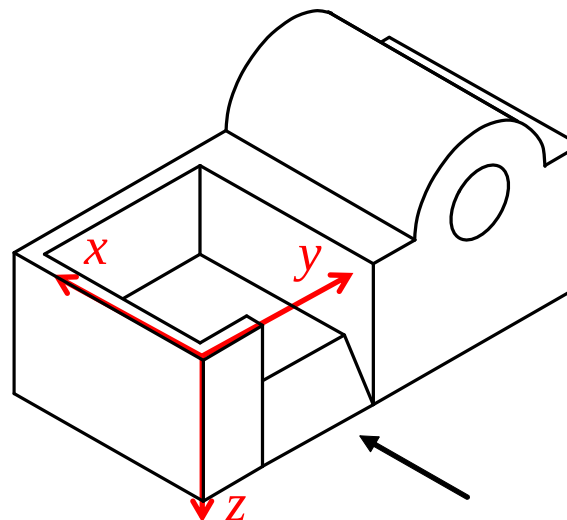
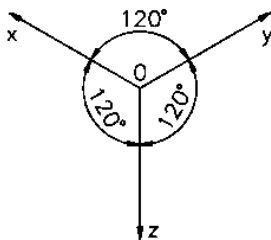
➤ Projeções cilíndrica ortogonal – Perspectivas isométricas



Comparando as três formas de representação, a perspectiva isométrica é a que dá a ideia menos deformada do objeto.

Iso quer dizer mesma; métrica quer dizer medida. A **perspectiva isométrica** mantém as **mesmas proporções do comprimento**, da largura e da altura do objeto representado.

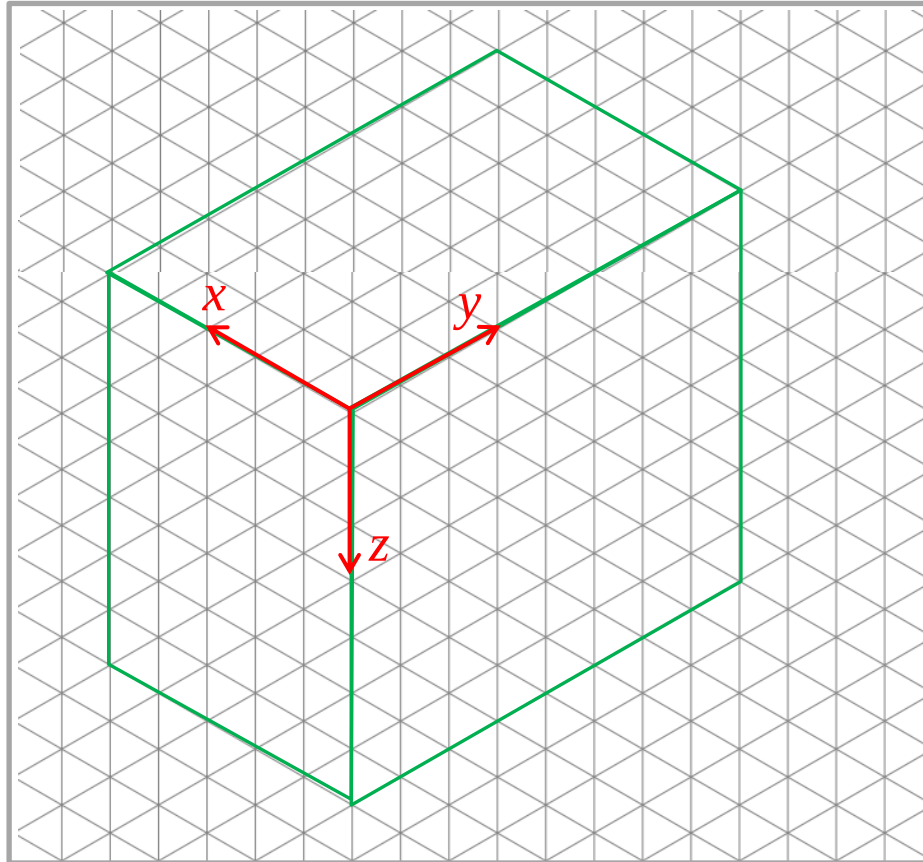
Os três eixos axonométricos têm a mesma inclinação em relação ao quadro, com **ângulos de 120°** entre si, e **todas as cotas estão na mesma escala**. Os três coeficientes de redução das escalas são iguais.



Isométrica: faces Frontal, Lateral Esquerda e Superior

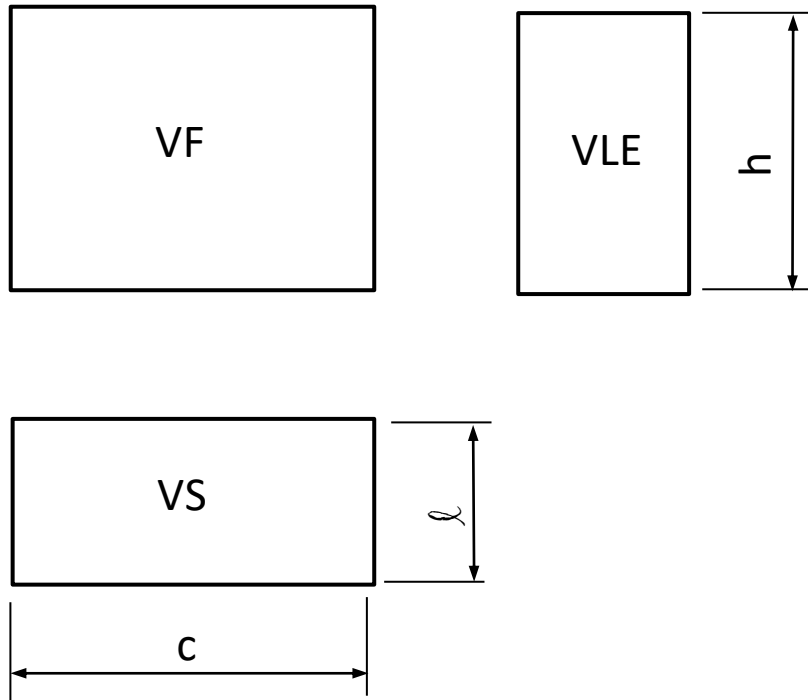
Papel com grade isométrica

As linhas são usadas para orientar o traçado da perspectiva isométrica

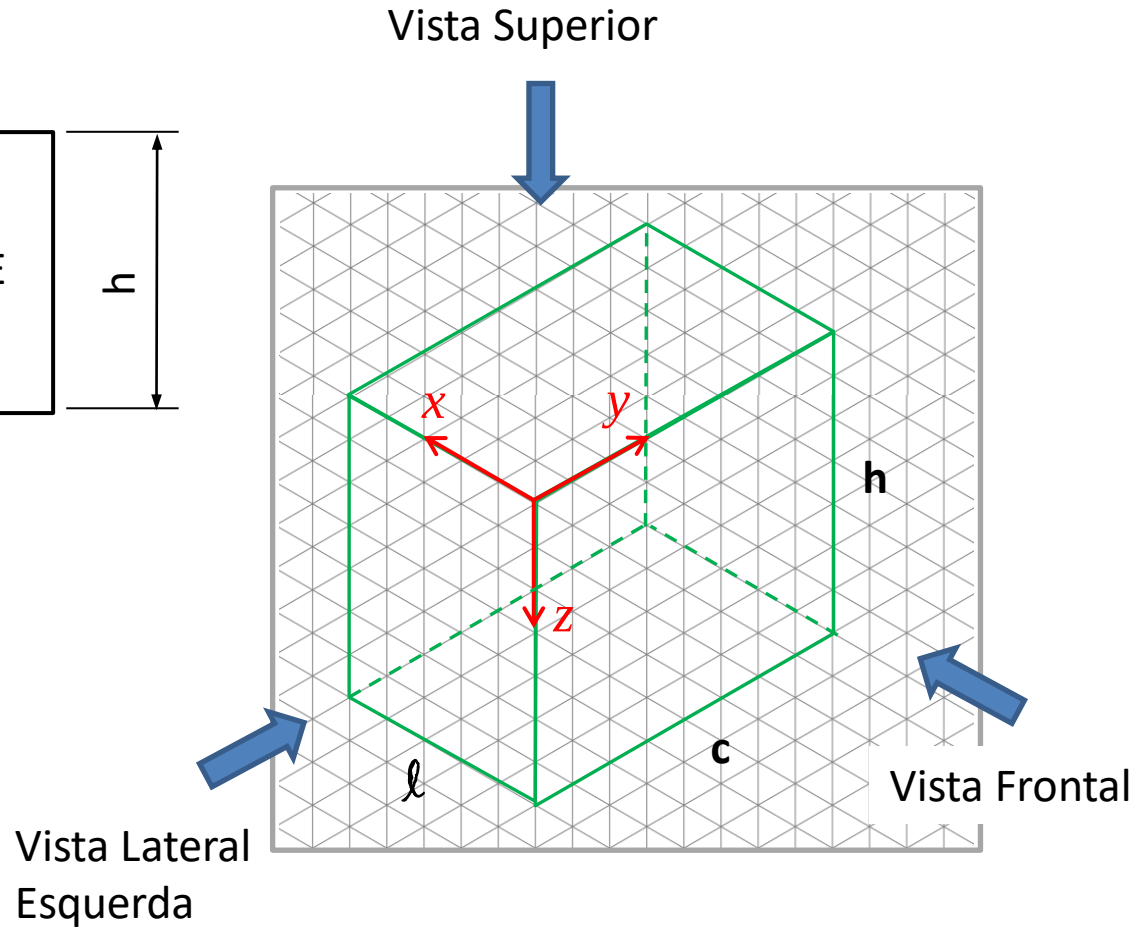


Eixos isométricos → formam entre si ângulos de 120°

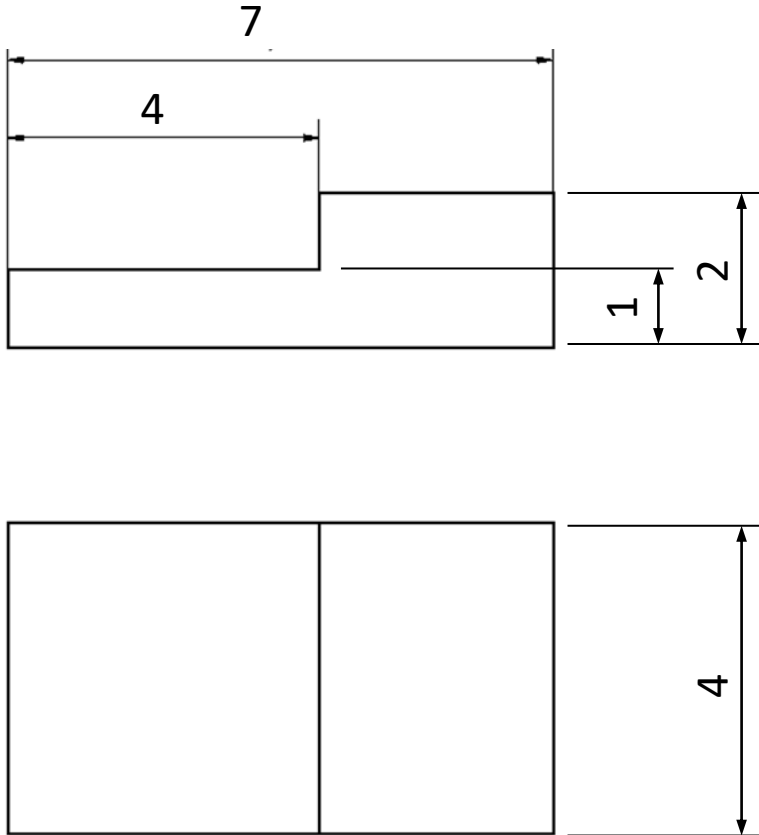
Vistas ortográficas



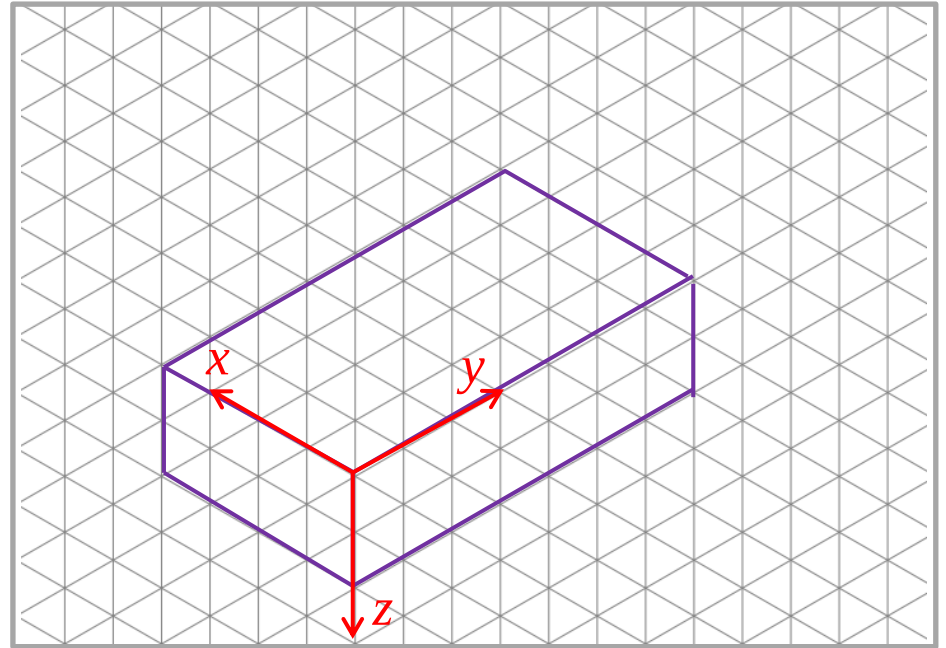
Perspectiva Isométrica



Vistas ortográficas

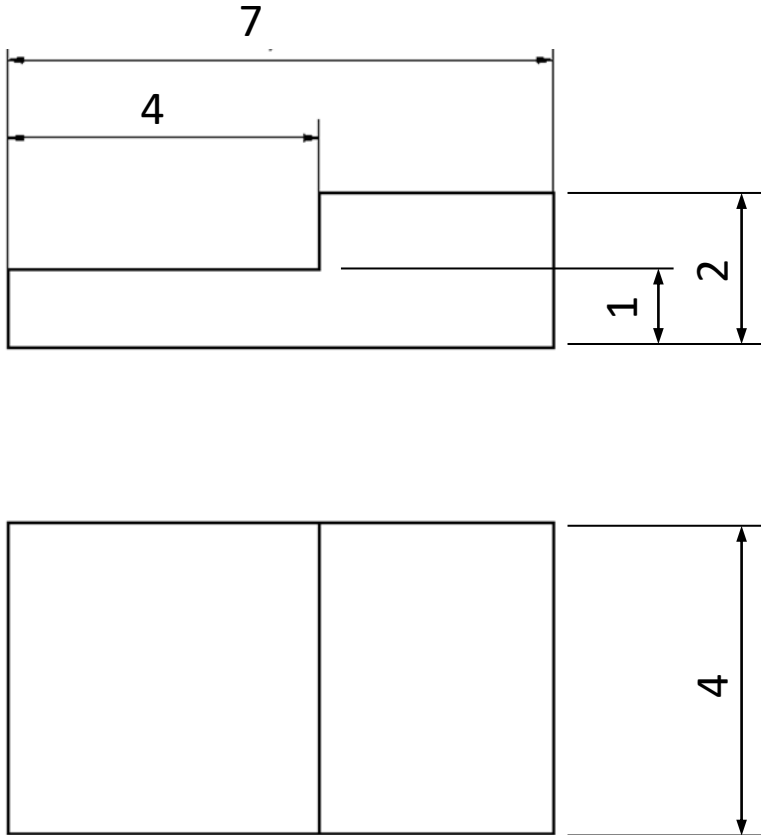


Perspectiva Isométrica - 1

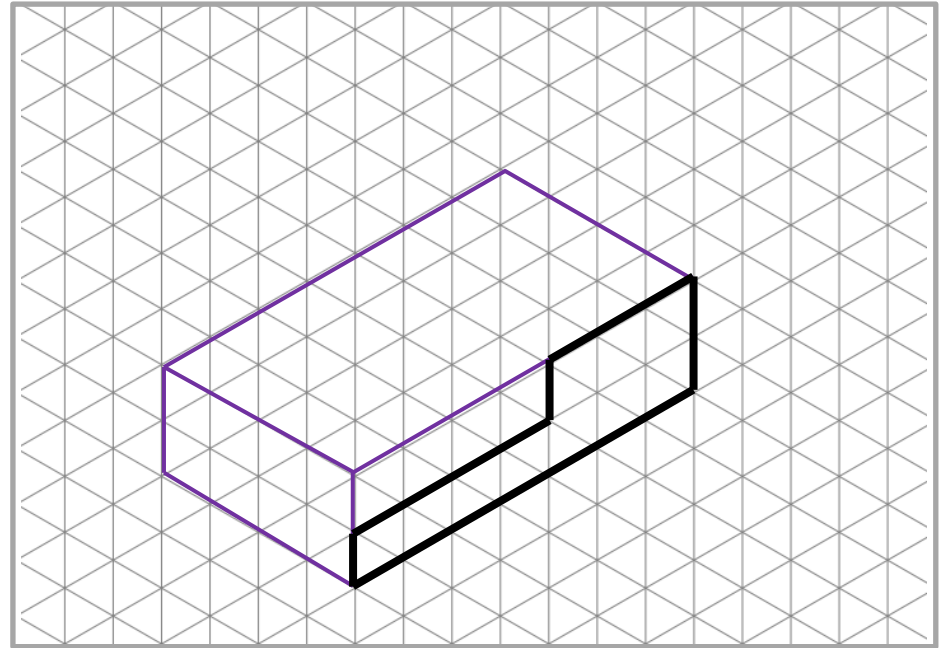


Desenhando o prisma auxiliar

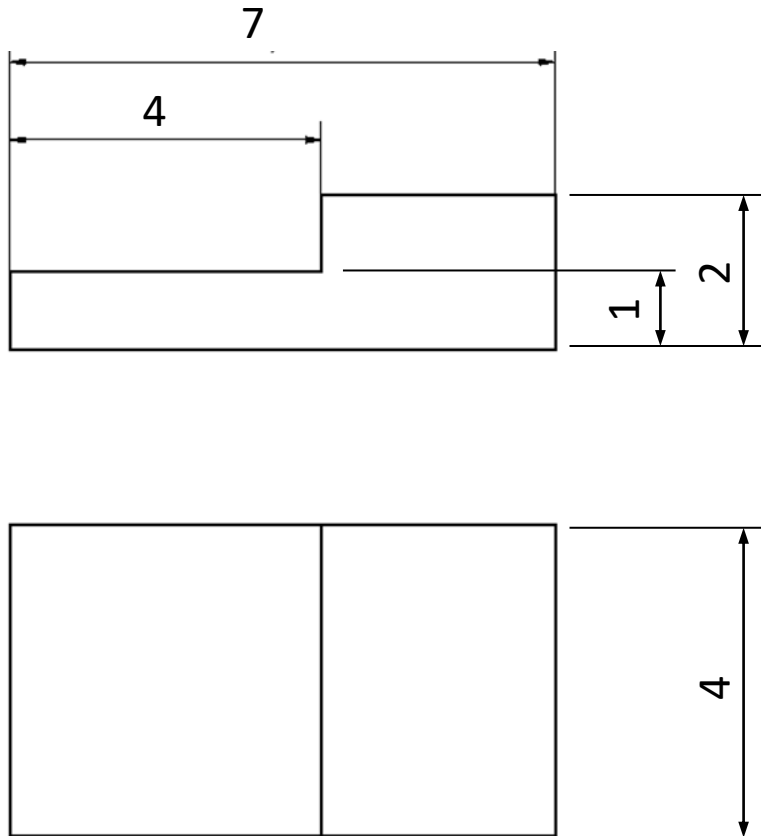
Vistas ortográficas



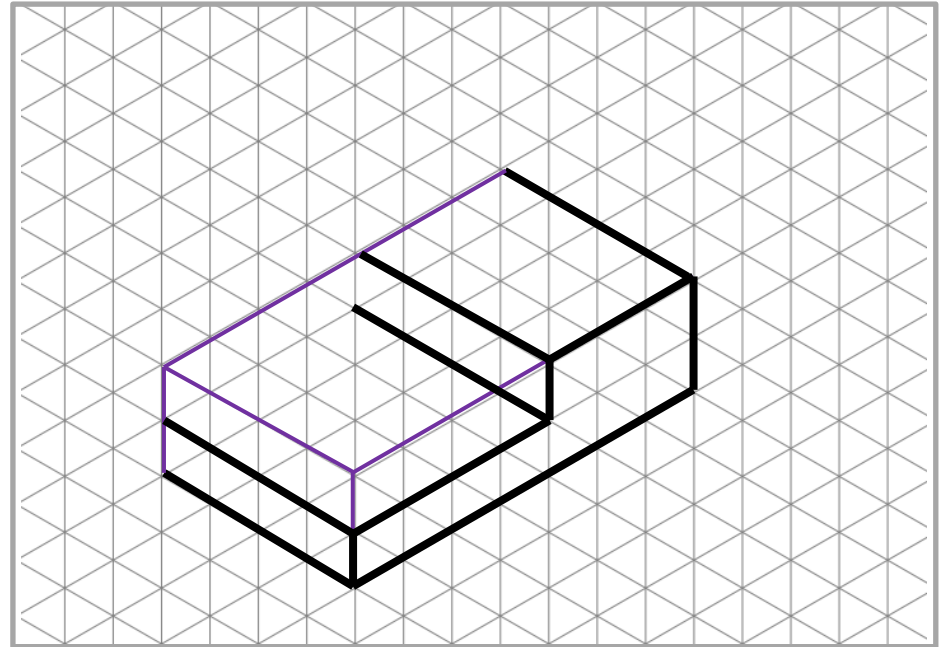
Perspectiva Isométrica - 1



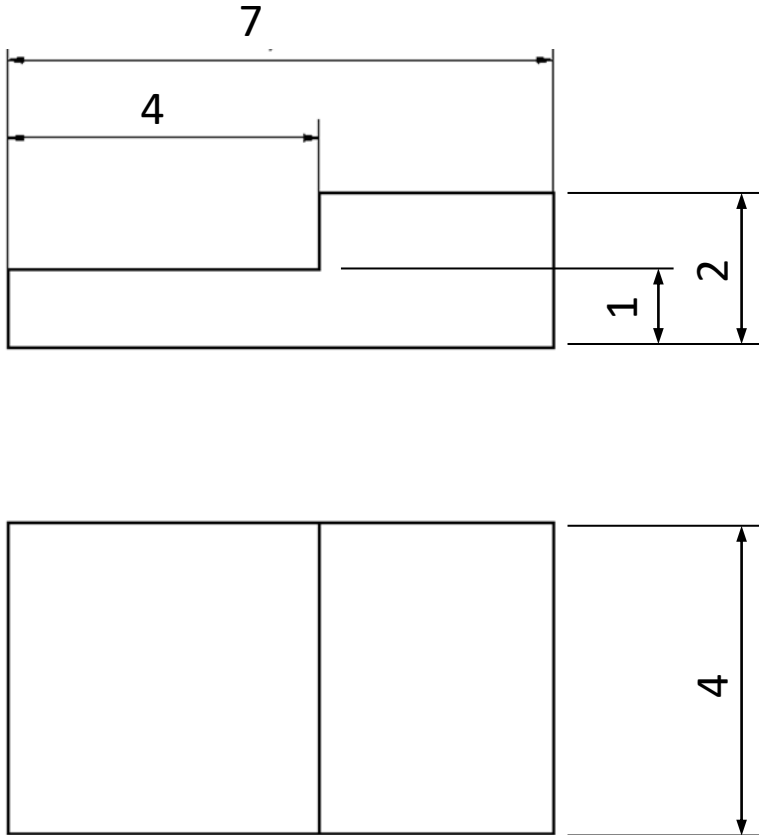
Vistas ortográficas



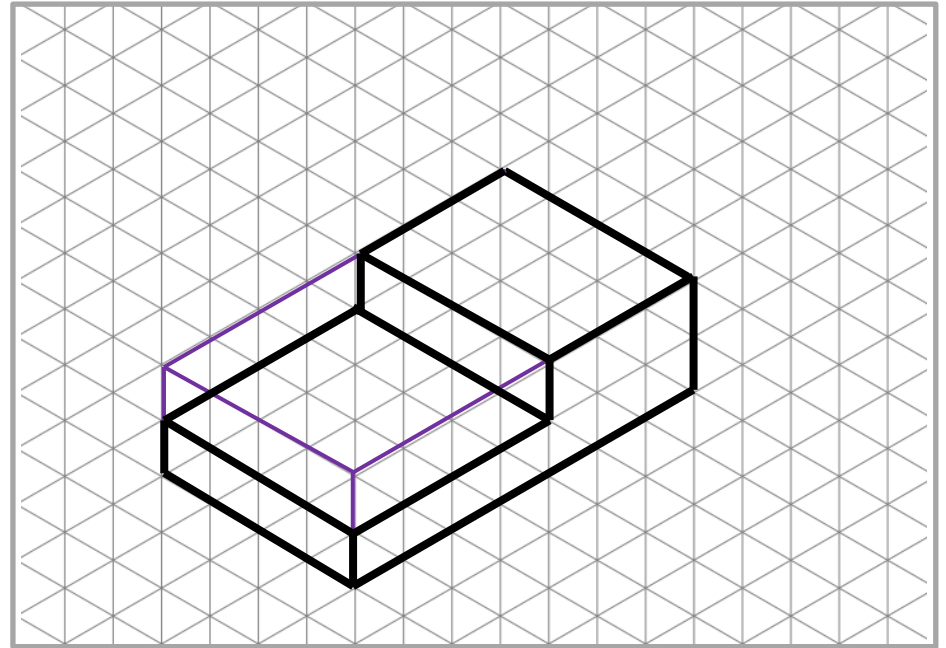
Perspectiva Isométrica - 1



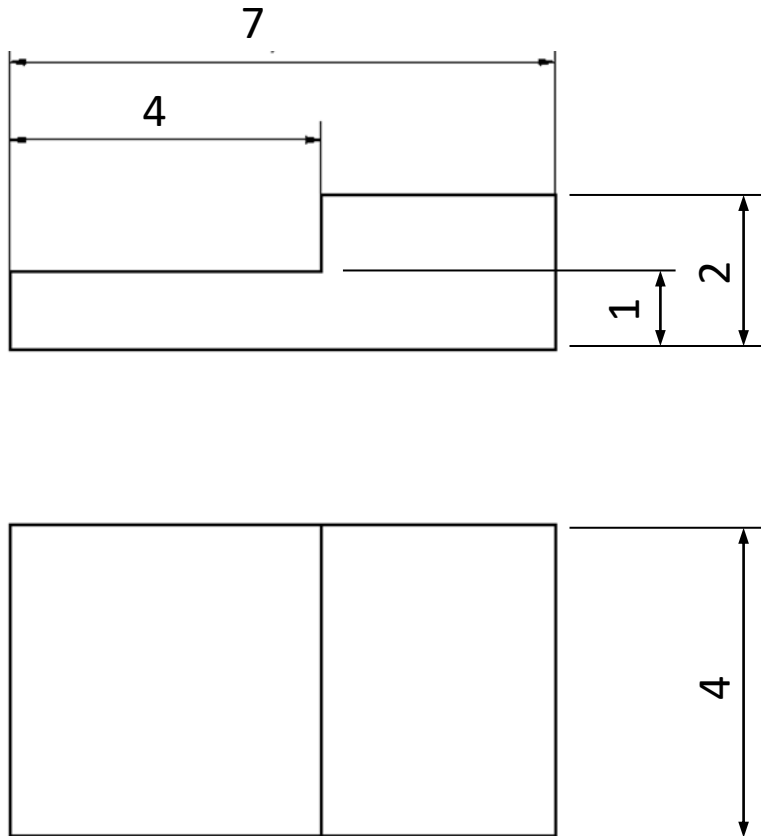
Vistas ortográficas



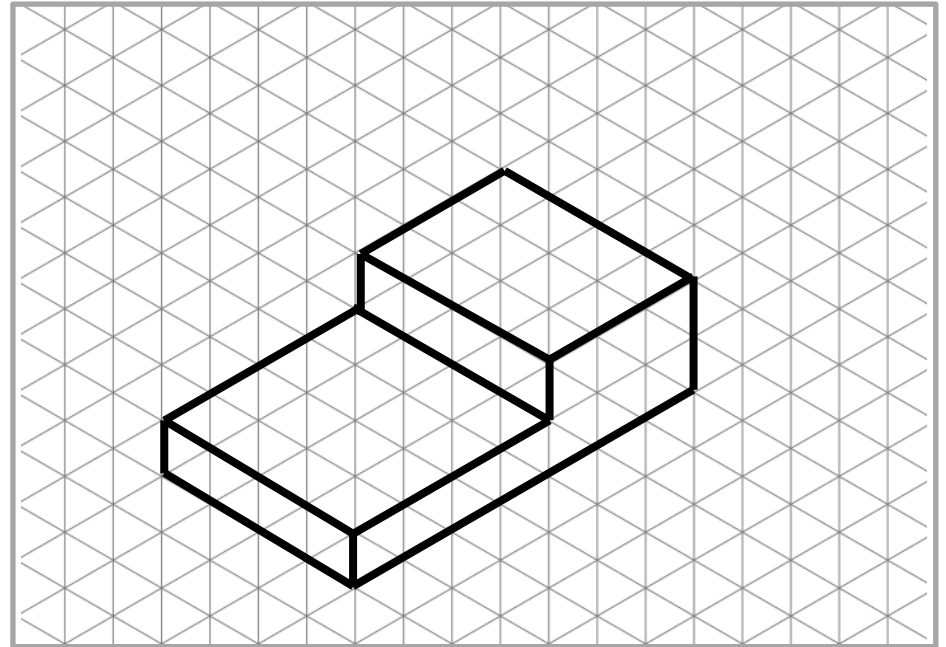
Perspectiva Isométrica - 1



Vistas ortográficas

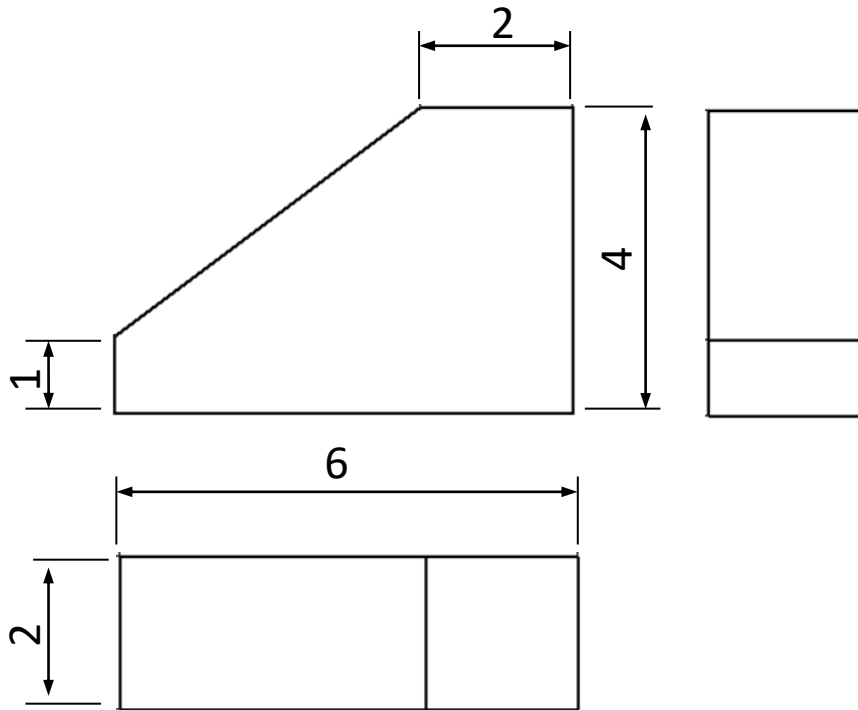


Perspectiva Isométrica - 1

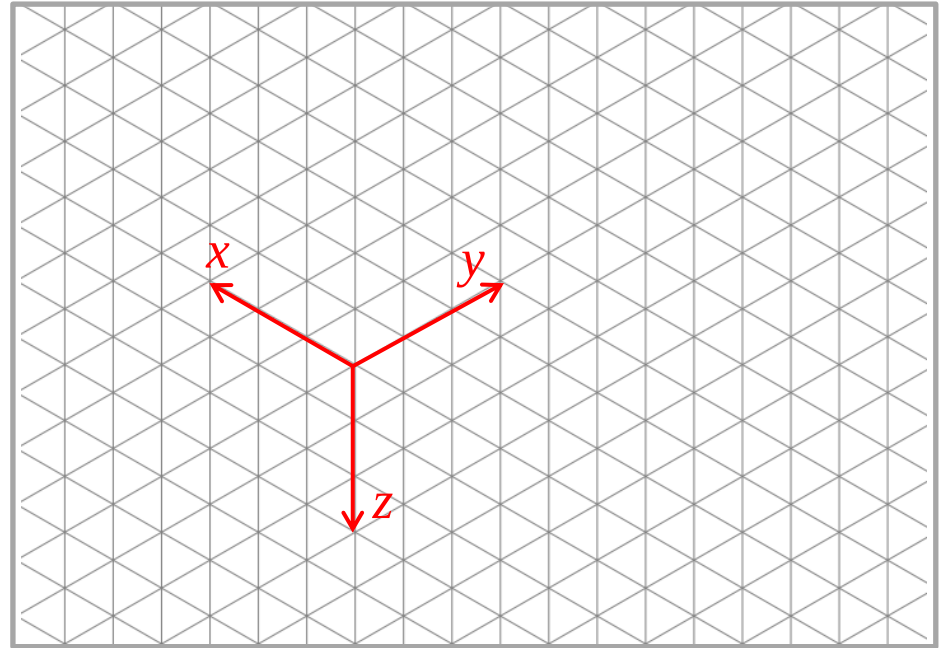


Apagando o prisma auxiliar

Vistas ortográficas

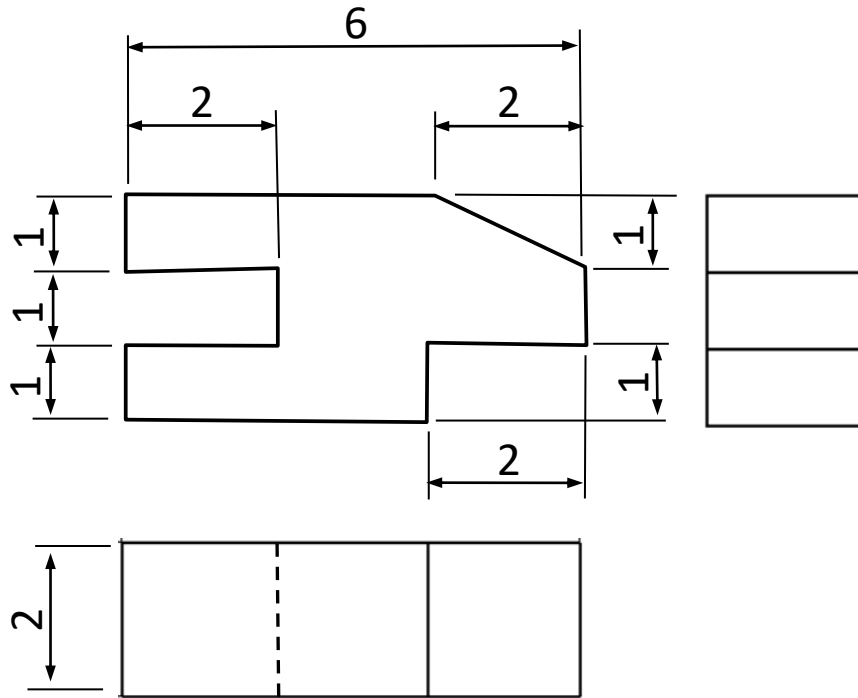


Perspectiva Isométrica - 2

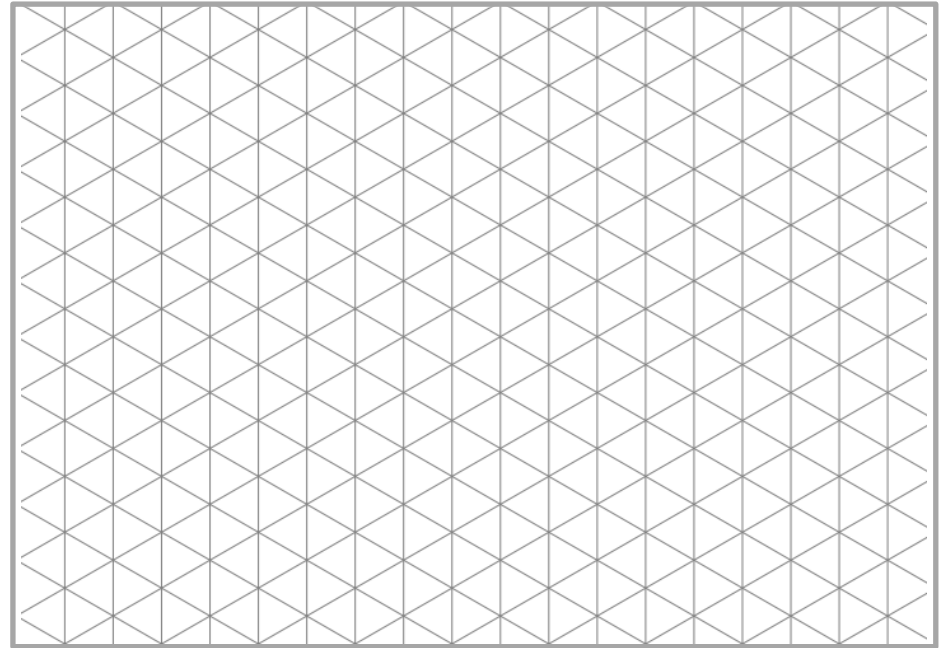


Eixos isométricos

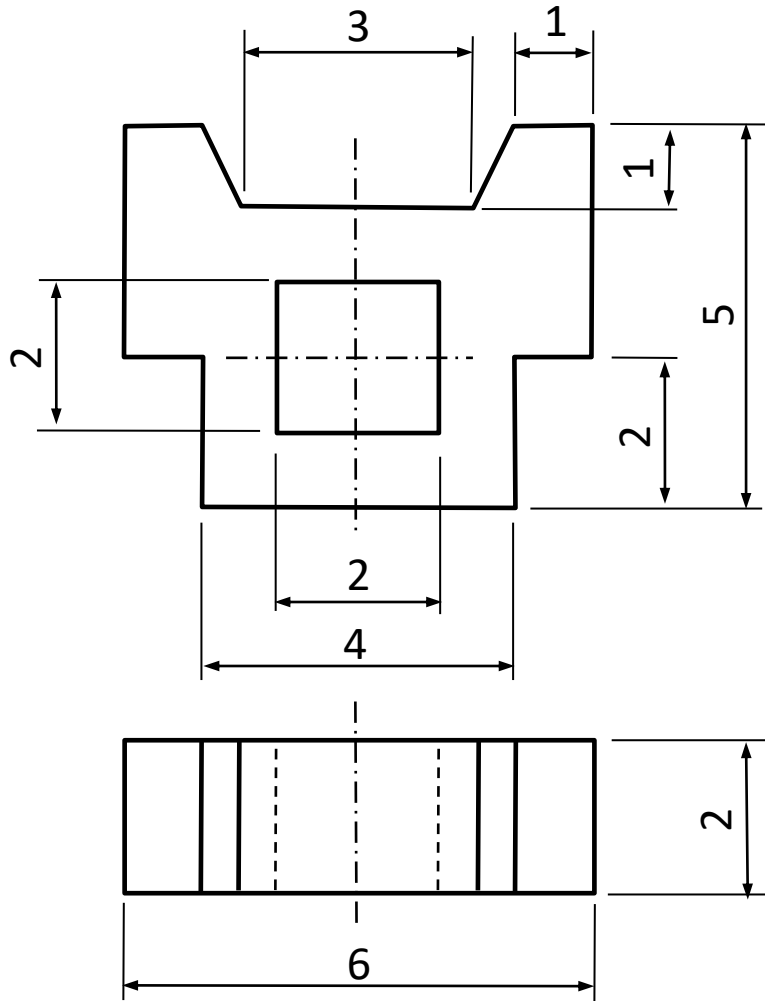
Vistas ortográficas



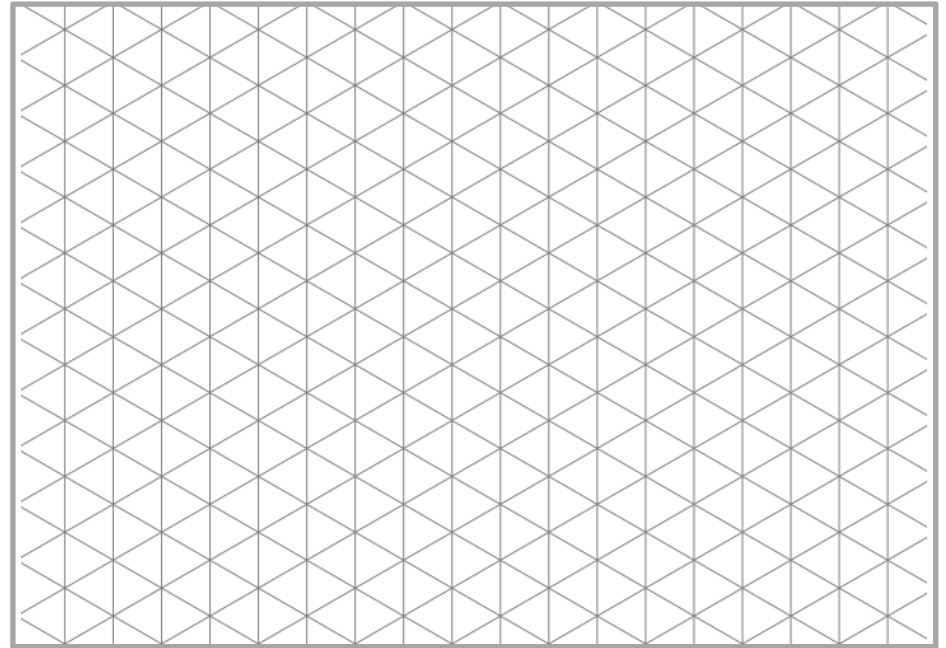
Perspectiva Isométrica - 3



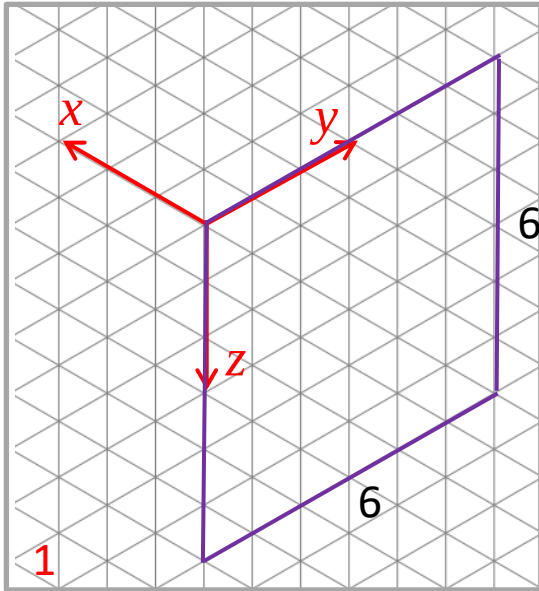
Vistas ortográficas



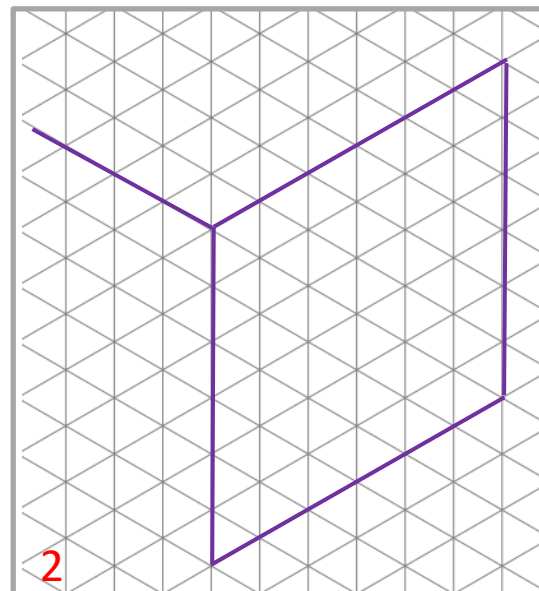
Perspectiva Isométrica - 4



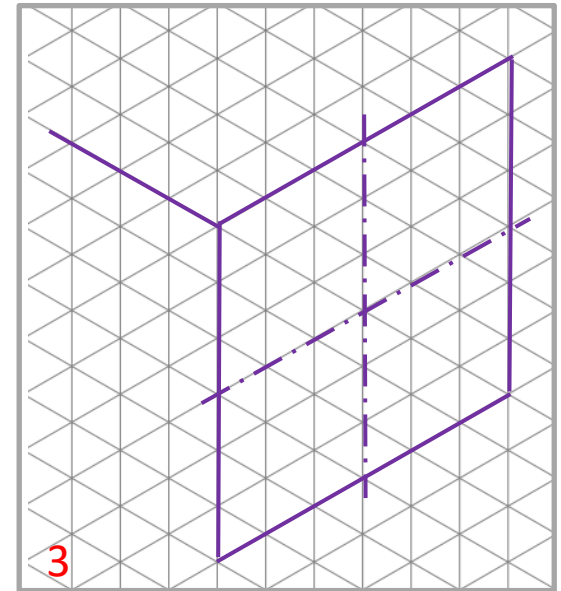
Perspectiva Isométrica de círculo (diâmetro 6 unidades)



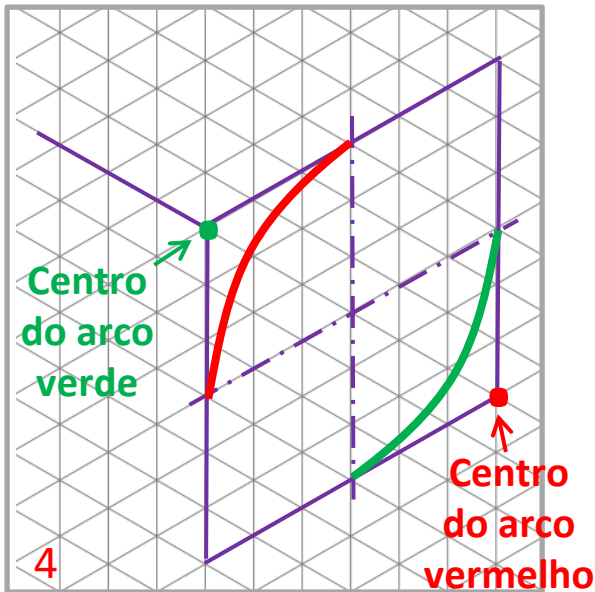
Desenhar entre os eixos y e z



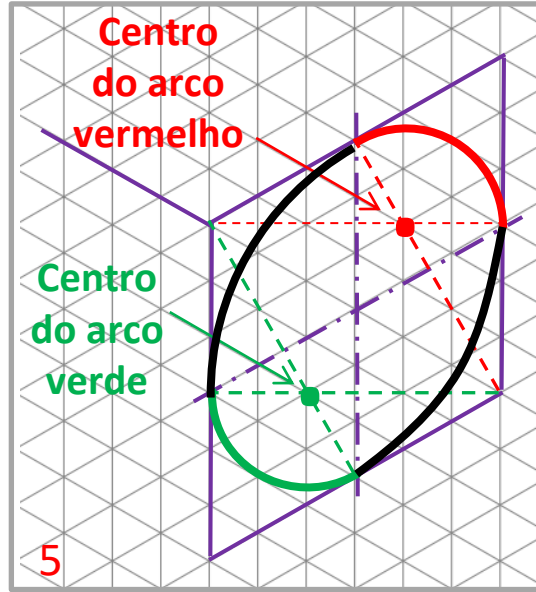
Desenhar quadrado 6 x 6



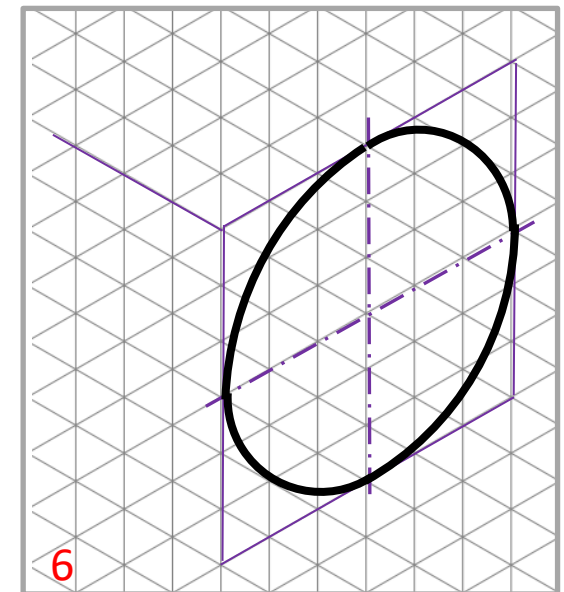
Desenhar linhas de centro



Desenhar arcos maiores



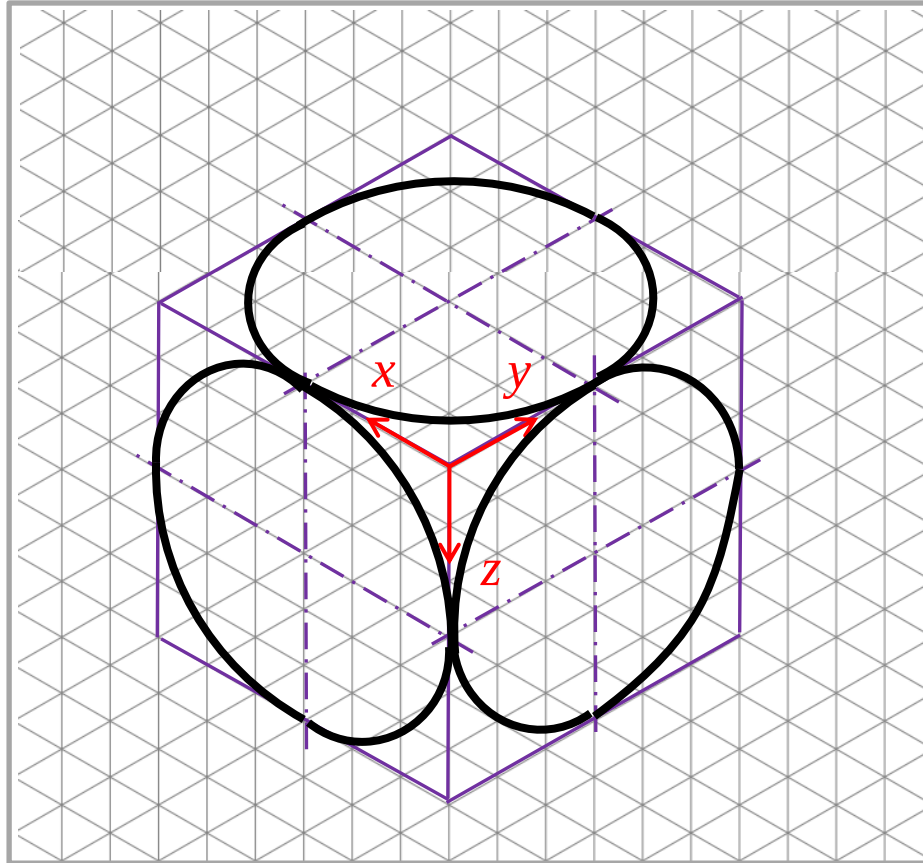
Desenhar arcos menores



Apagar linhas auxiliares

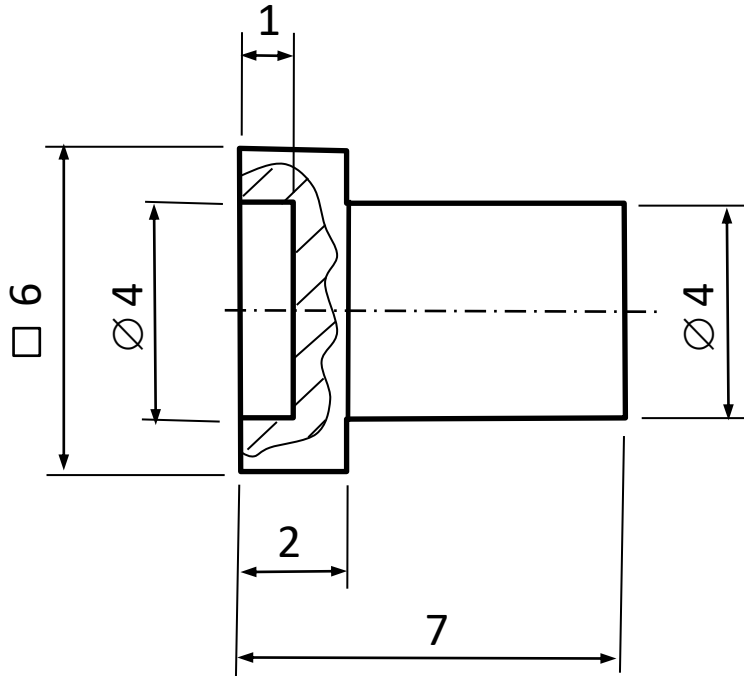
Perspectiva Isométrica

Círculos nos planos xy , xz e yz

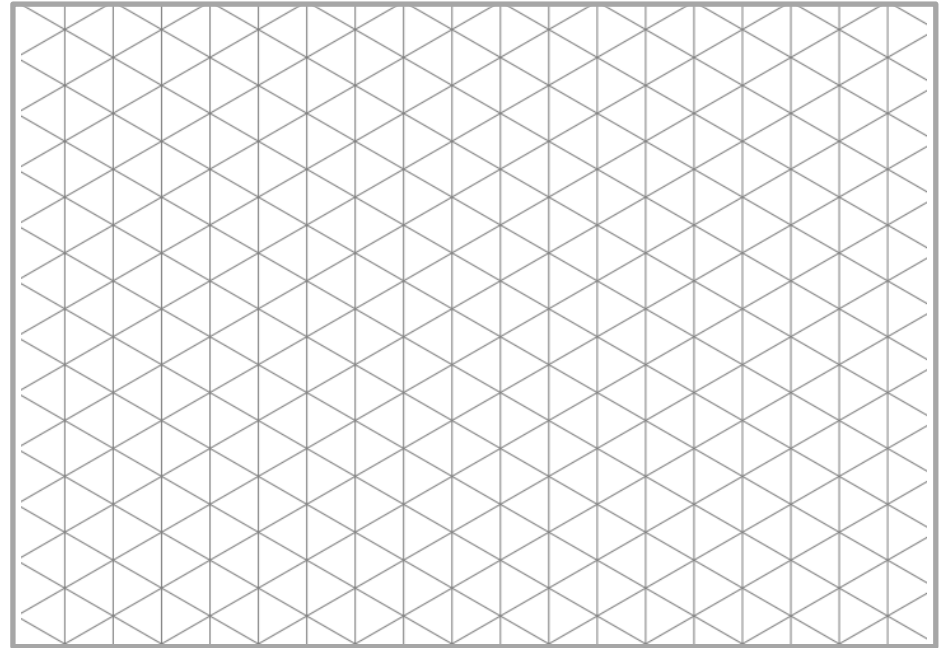


(diâmetro 6 unidades)

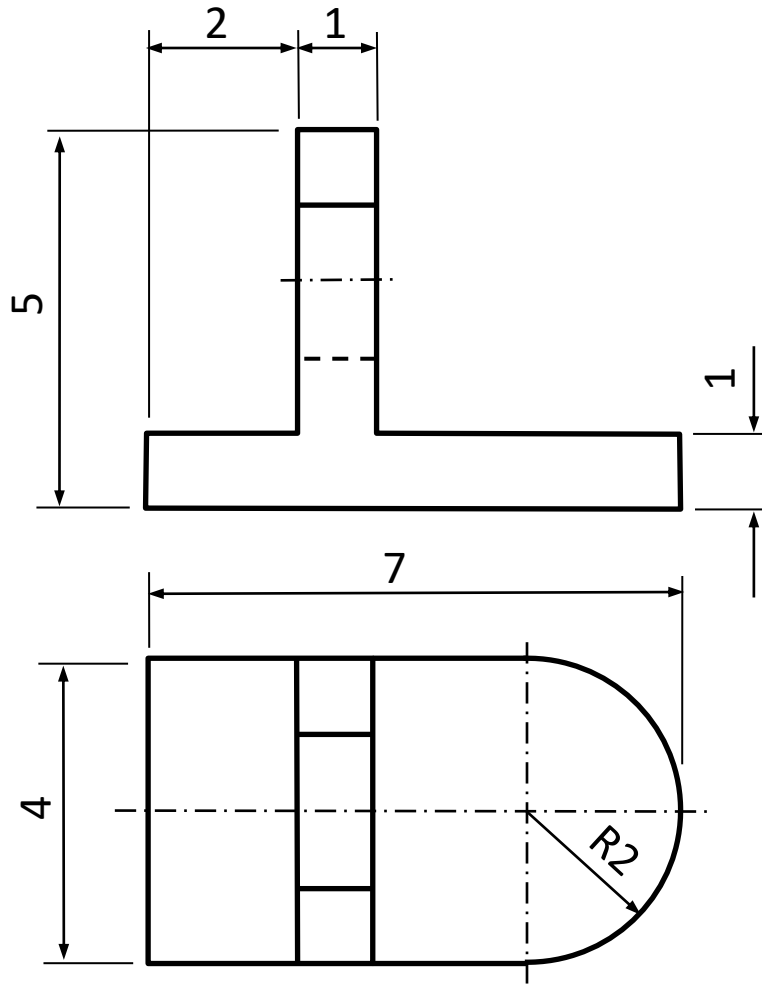
Vistas ortográficas



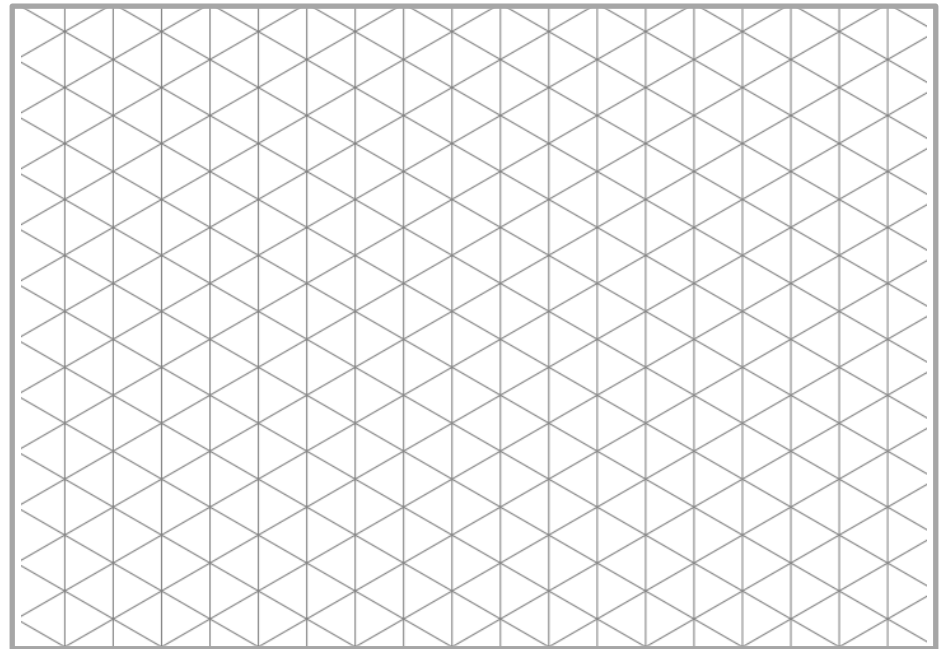
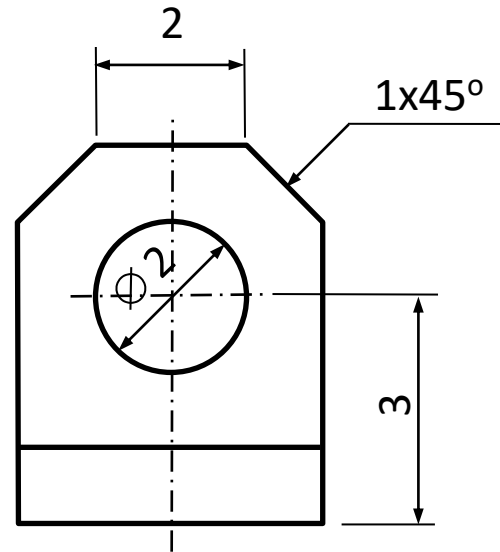
Perspectiva Isométrica - 5



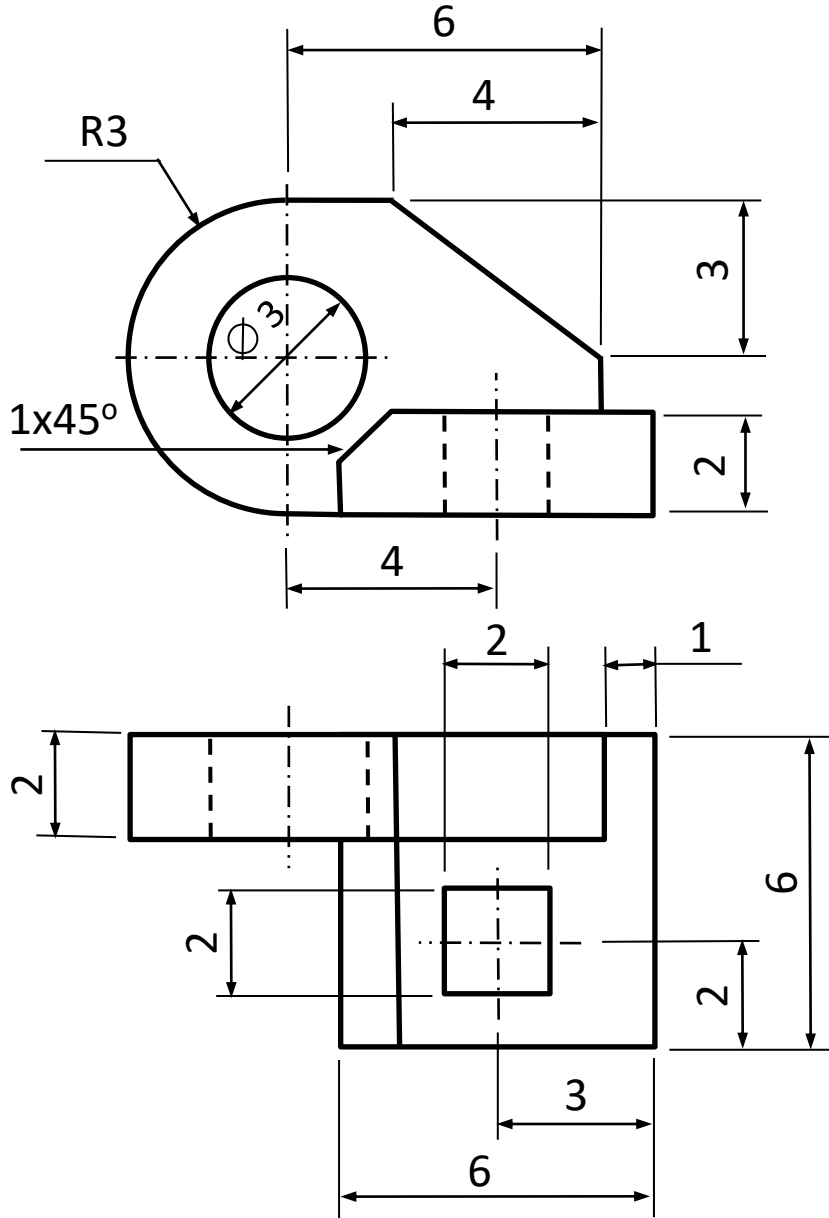
Vistas ortográficas



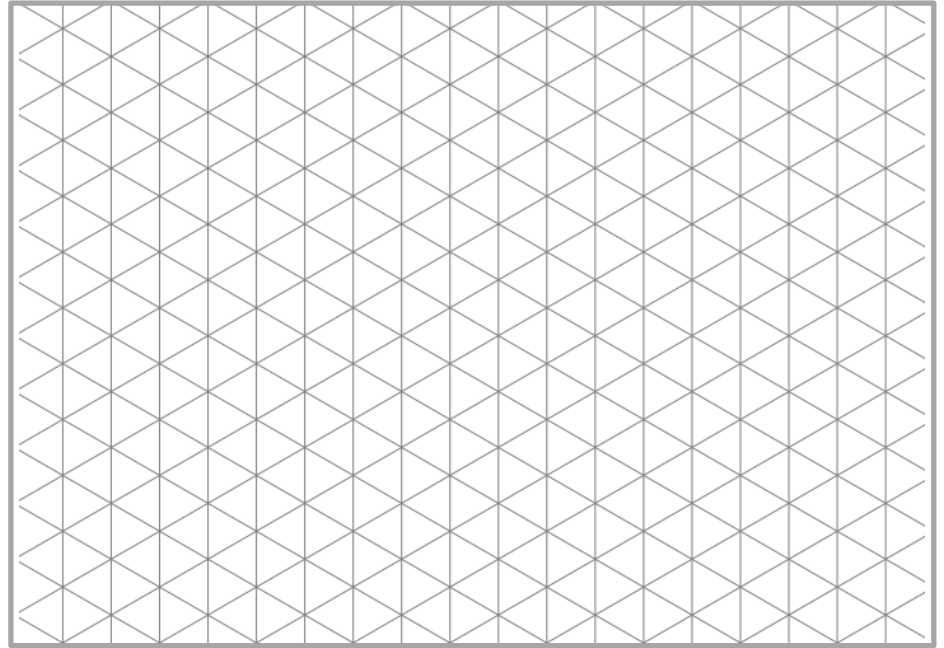
Perspectiva Isométrica - 6



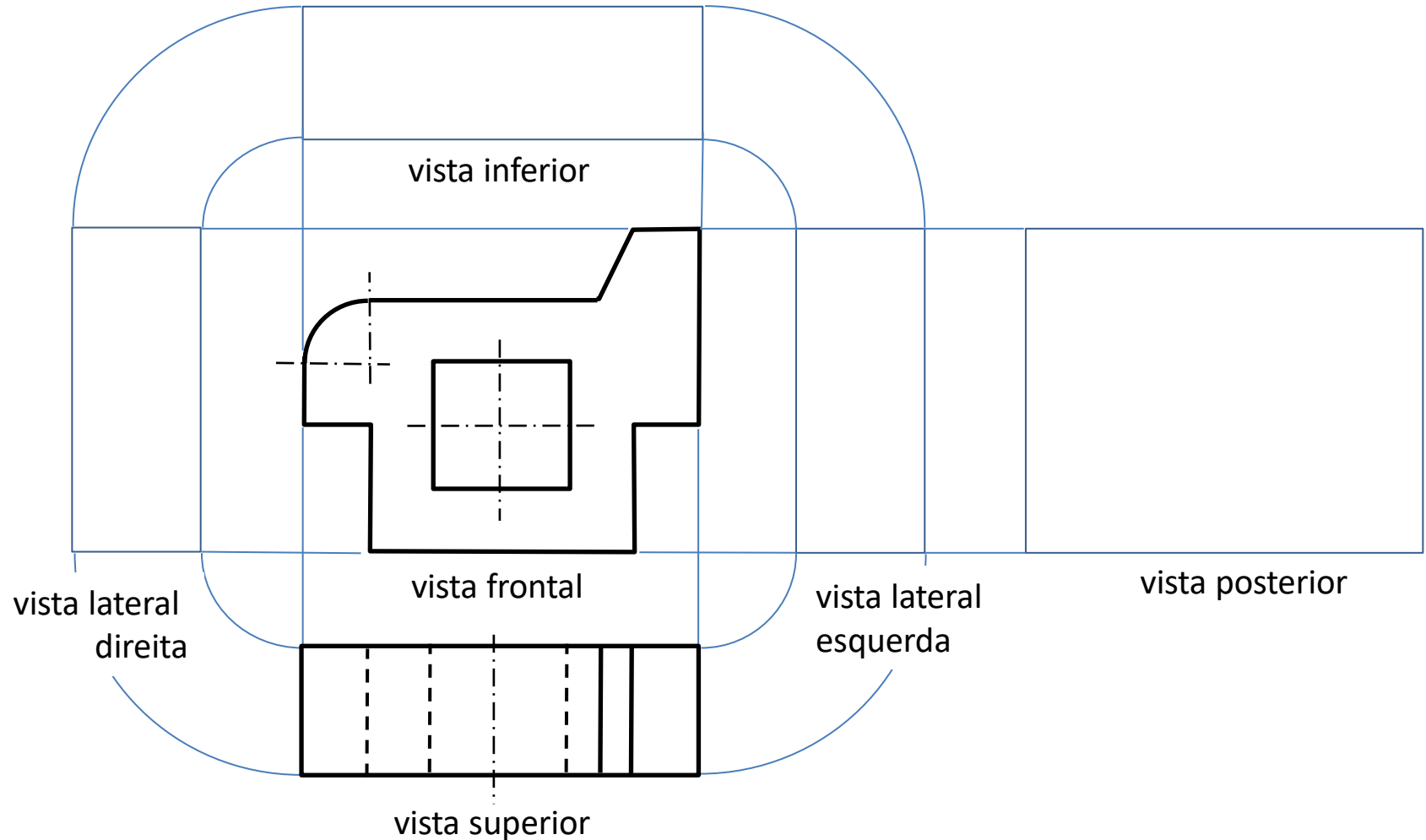
Vistas ortográficas



Perspectiva Isométrica - 7



Desenhar vistas ortográficas no 1º diedro



OBS.: O desenho deve obedecer: 1) posicionamento; 2) alinhamento; e 3) espaçamento.