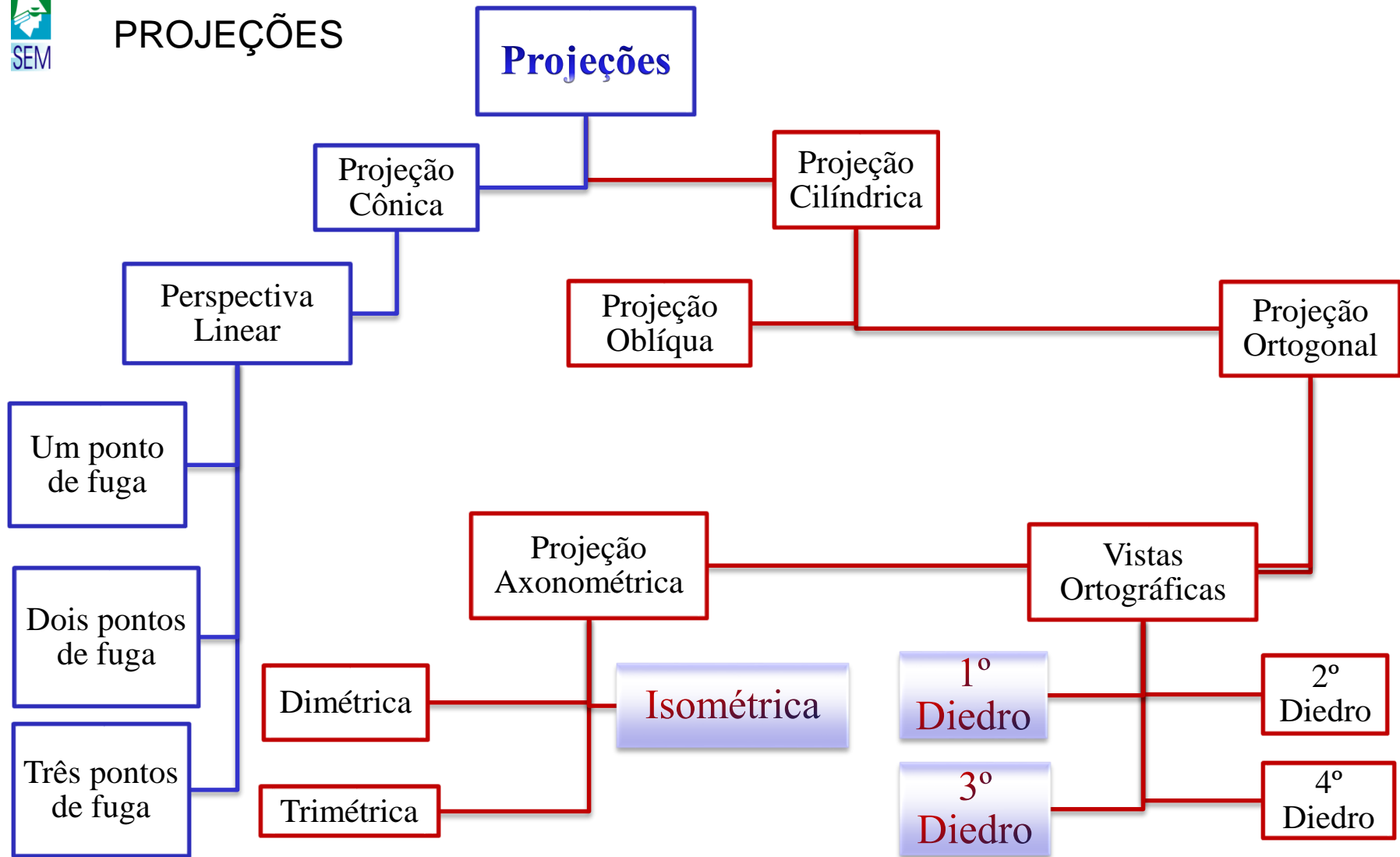


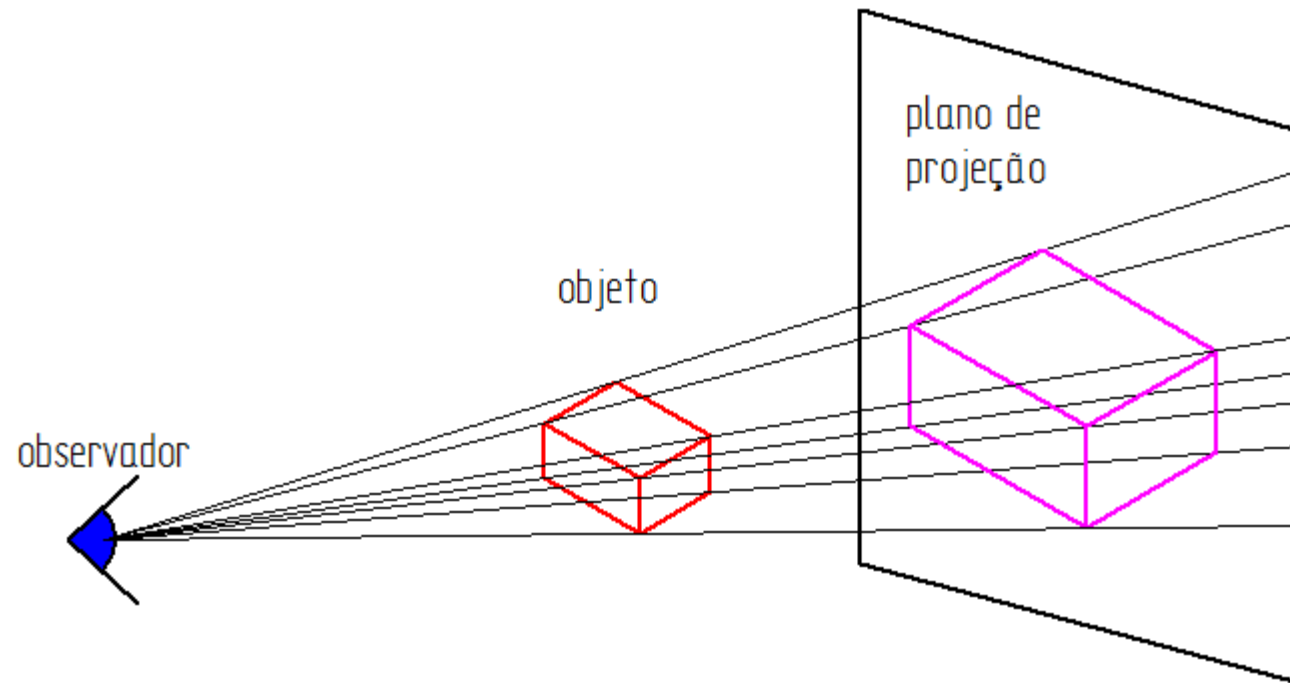
DESENHO TÉCNICO MECÂNICO I

Aula 02 – Projeção, vistas, diedros

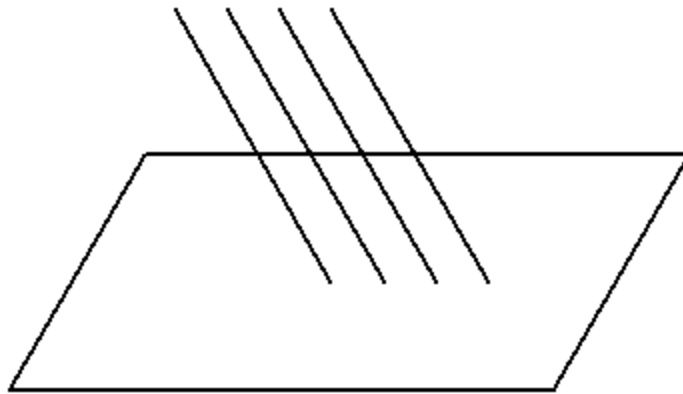
PROJEÇÕES



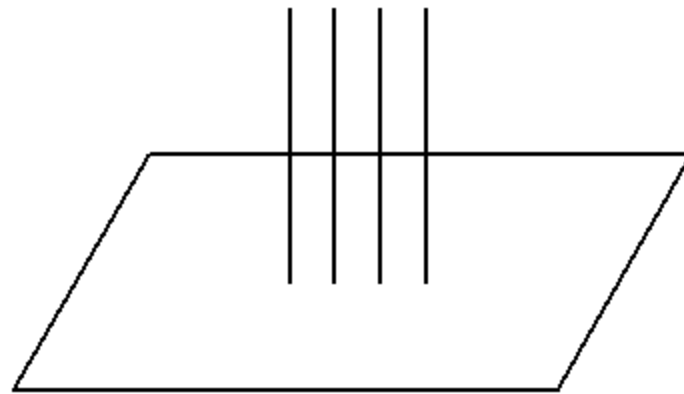
PROJEÇÕES – Perspectiva cônica



PROJEÇÕES – Perspectivas cilíndricas

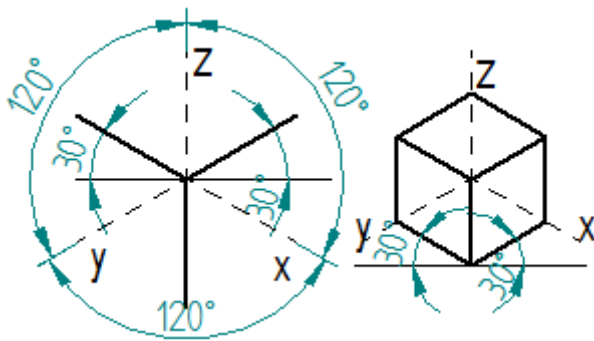


Projeção oblíqua



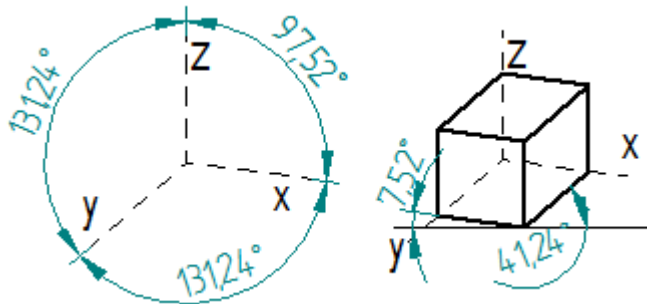
Projeção ortogonal

Projeções axonométricas



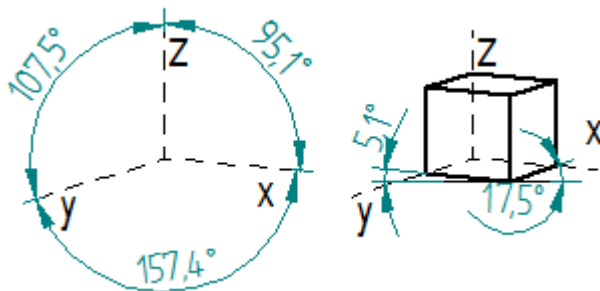
Perspectiva isométrica

- Eixos axonométricos – 120 graus
- Coeficientes de redução iguais nos três eixos



Perspectiva dimétrica

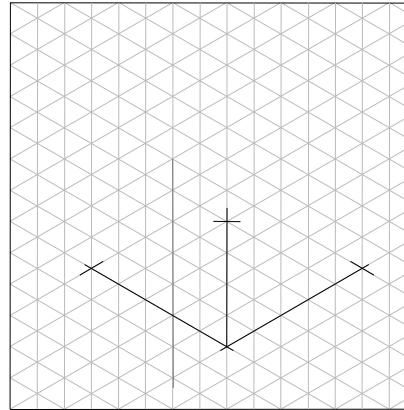
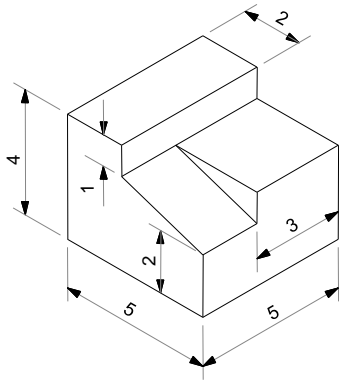
- Eixos axonométricos – dois ângulos iguais e um diferente
- Coeficientes de redução iguais em dois eixos e um diferente



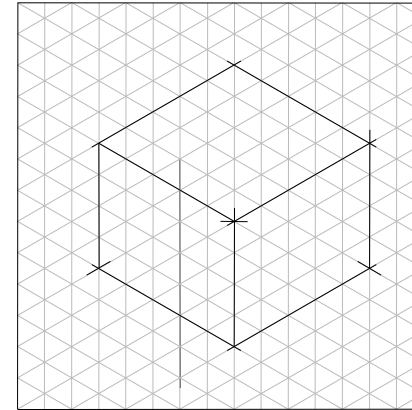
Perspectiva trimétrica

- Eixos axonométricos – três ângulos diferentes
- Coeficientes de redução diferentes em todos os eixos

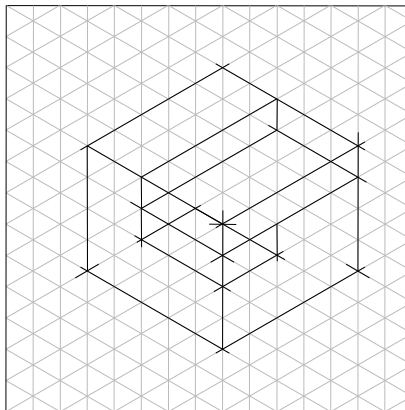
PERPECTIVA ISOMÉTRICA – elementos paralelos e oblíquos



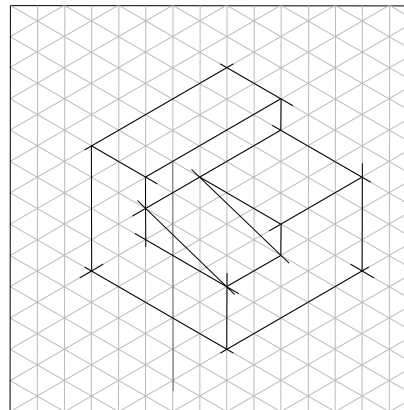
01 - marcar dimensões



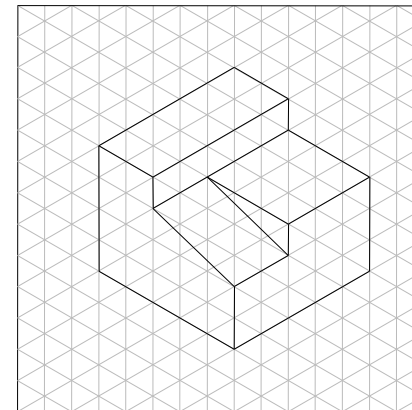
02 - traçar as três faces



03 - traçar os detalhes paralelos e apagar linhas excedentes

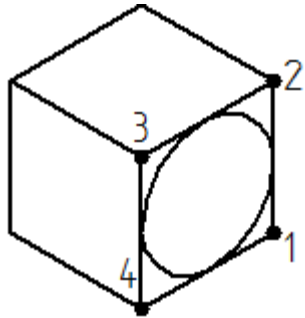


04 - traçar os segmentos oblíquos e apagar linhas excedentes

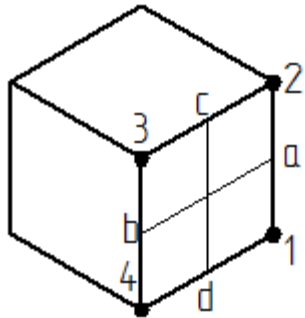


05 - apagar linhas de construção e reforçar contornos

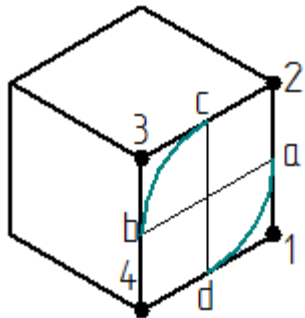
PERPECTIVA ISOMÉTRICA – círculo



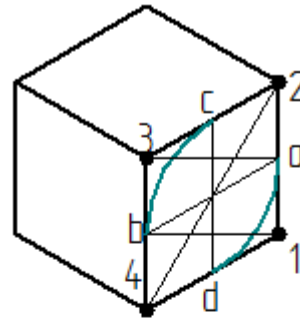
- Dada uma perspectiva isométrica e os vértices 1, 2, 3, 4.



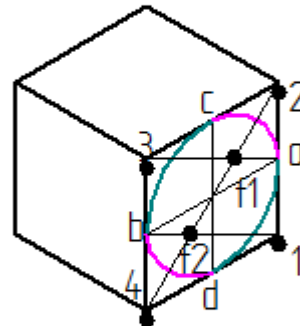
- Determinar os pontos médios (a, b, c, d) dos segmentos de reta.



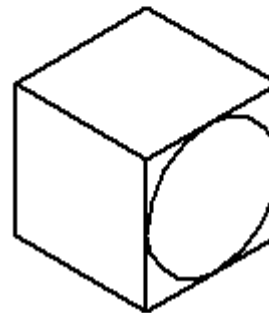
- Centrar a ponta seca do compasso no vértice 1 e fazer abertura até os pontos médios c e d.
- Fazer o arco.



- Unir o vértice 3 ao ponto a.
- Unir os vértices 2 e 4.
- Unir o vértice 1 ao ponto b.



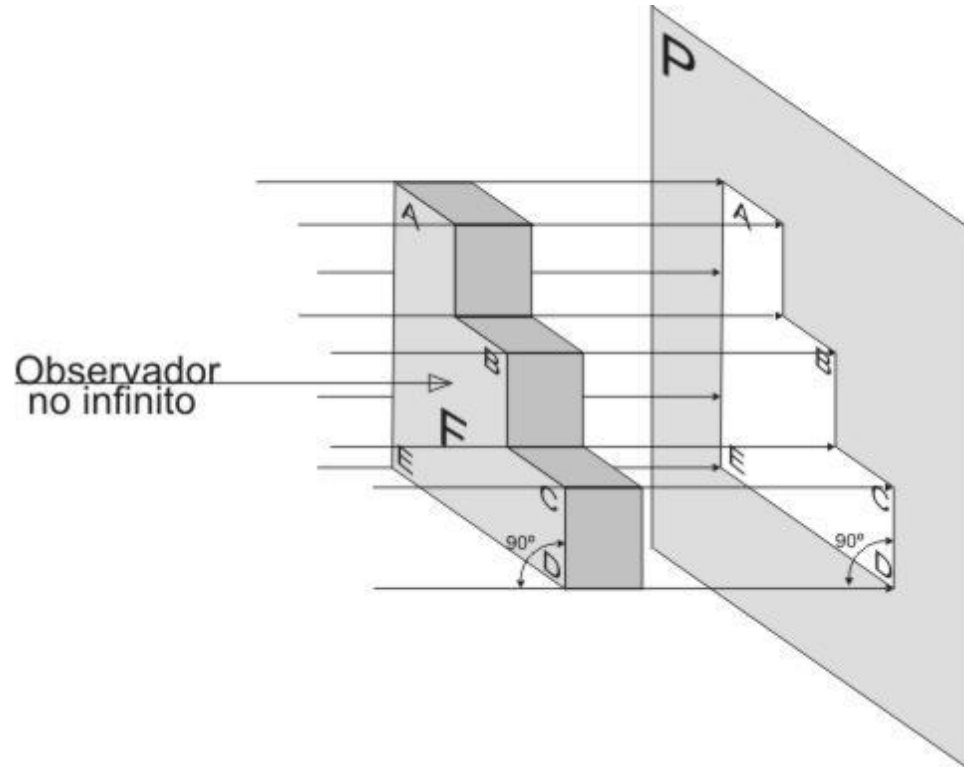
- Centrar a ponta seca do compasso no ponto f1 e fazer abertura até o ponto c.
- Fazer o arco.



- Apagar as linhas de construção

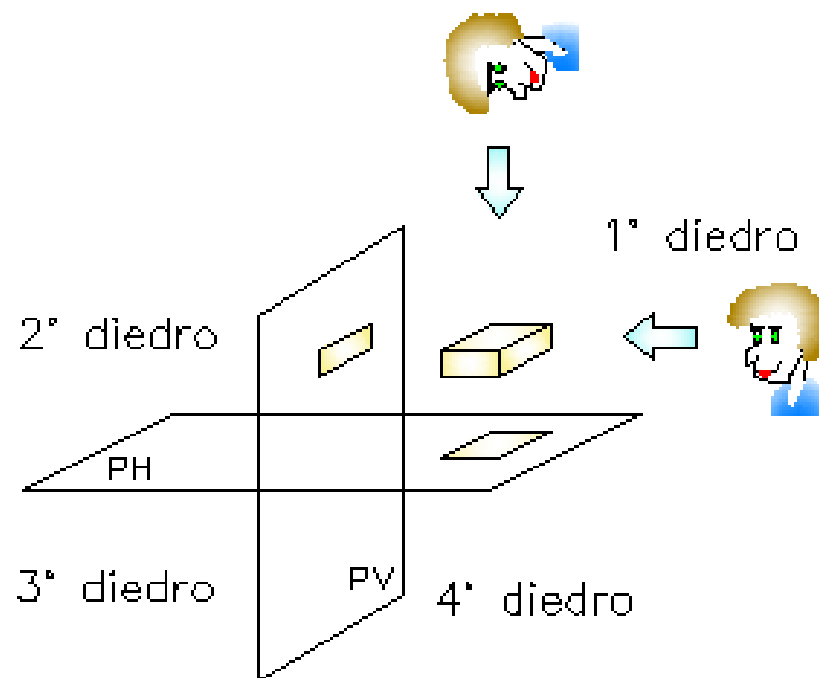
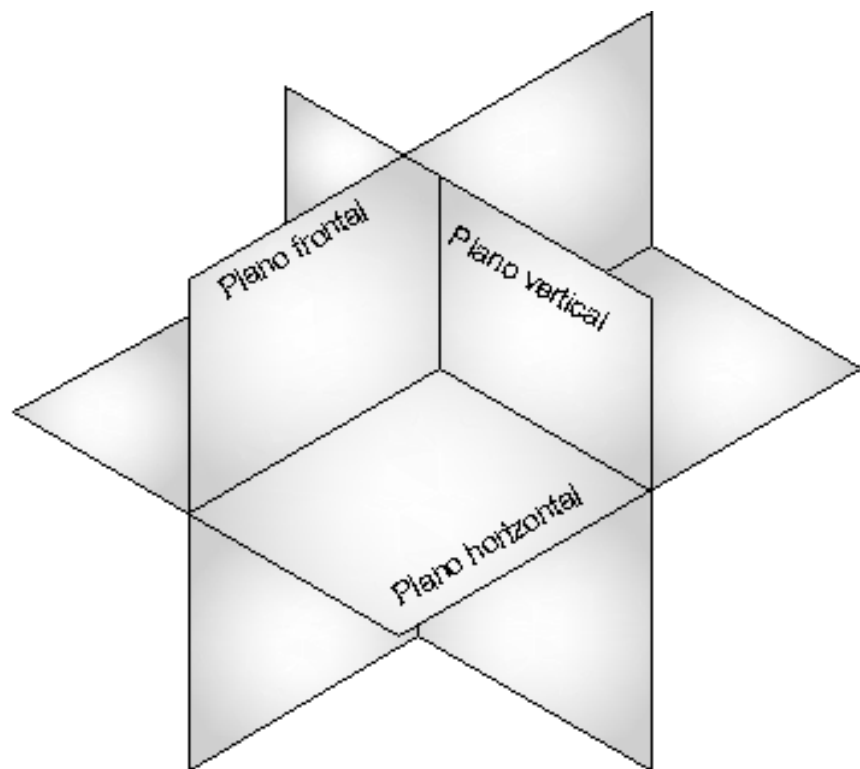
PROJEÇÕES ORTOGONAIS

Linhas projetantes paralelas entre si e perpendiculares ao plano de projeção reproduzem no plano uma imagem com o mesmo contorno e mesma grandeza do objeto. Na Projeção Ortogonal, a figura plana considerada é reproduzida em verdadeira grandeza.



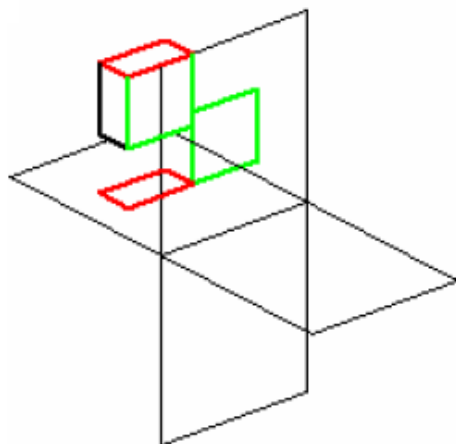
Projeção ortogonal no 1º Diedro

No Brasil, assim como na Europa, Ásia e em outros países usa-se da projeção no primeiro diedro, e o 3º diedro é usado nos EUA e no Canadá.

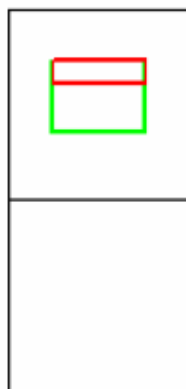


Diedros – projeção de vistas

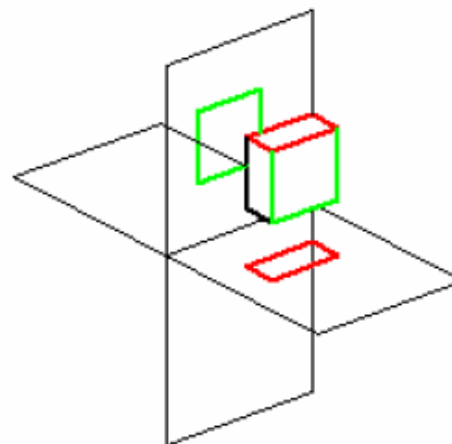
Segundo diedro



Épura



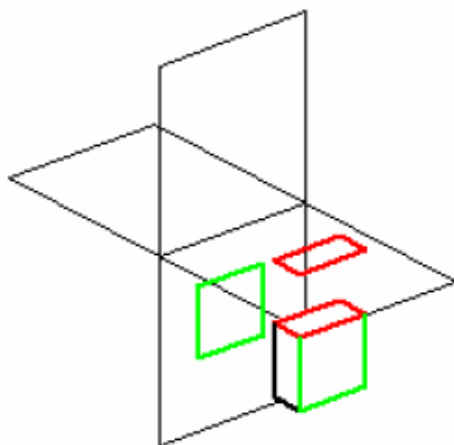
Primeiro diedro



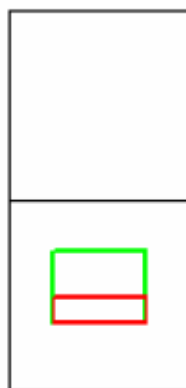
Épura



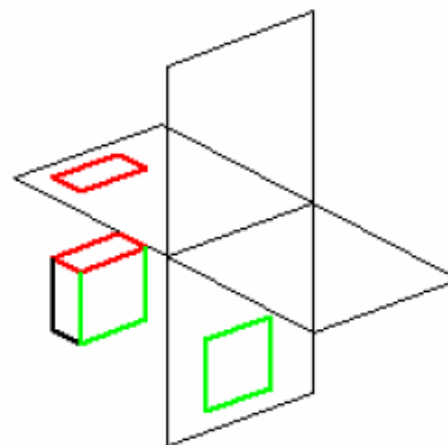
Quarto diedro



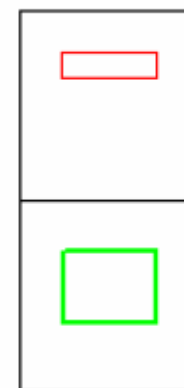
Épura



Terceiro diedro



Épura



Símbolos de Projeção ortogonal no 1º Diedro e 3º Diedro

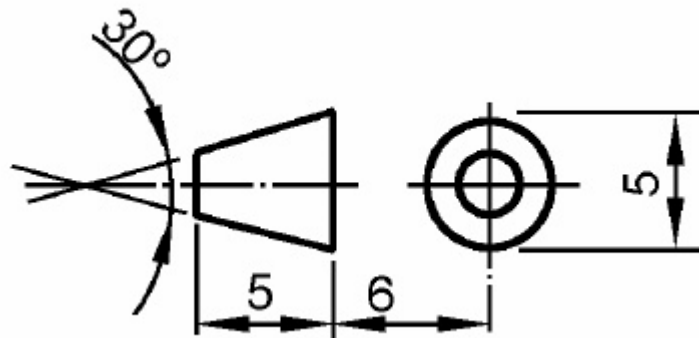
Na legenda deve estar incluída a representação do diedro usado no desenho:



1º Diedro

3º Diedro

O Símbolo deve ter as seguintes dimensões:

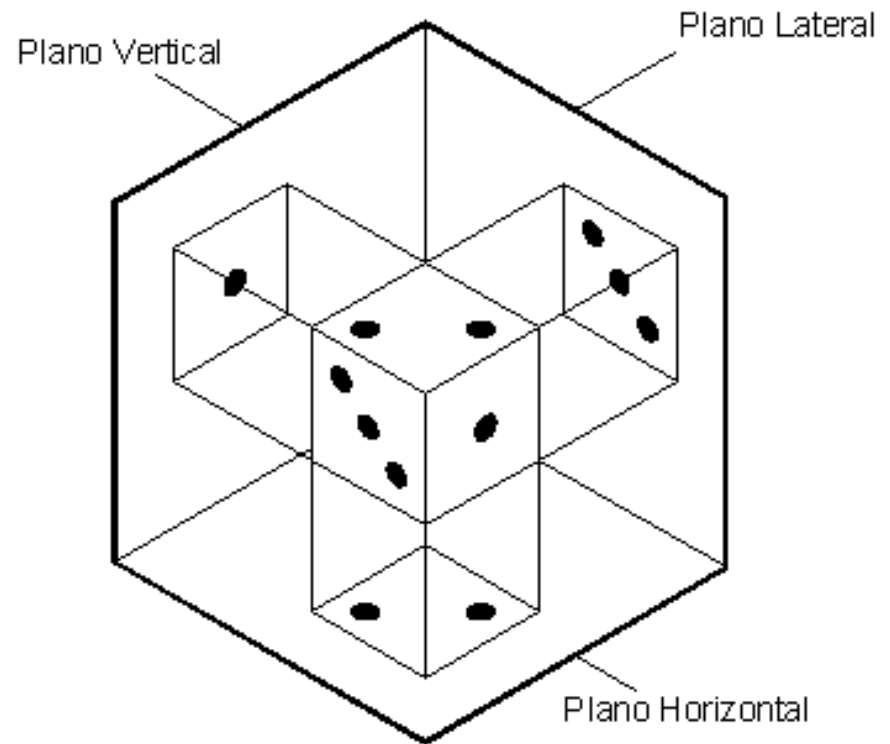
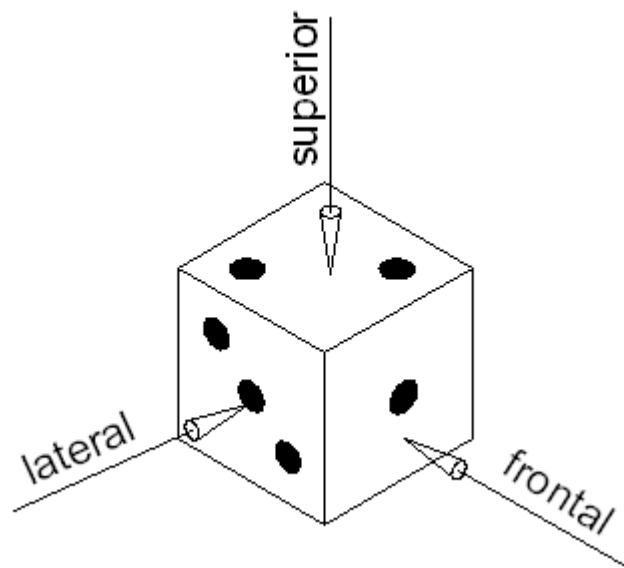


Fonte: Apostila Desenho Mecânico. Desenho com instrumentos. Convênio SENAI/São Paulo

Projeção ortogonal no 1º Diedro - procedimento

Objeto: dado

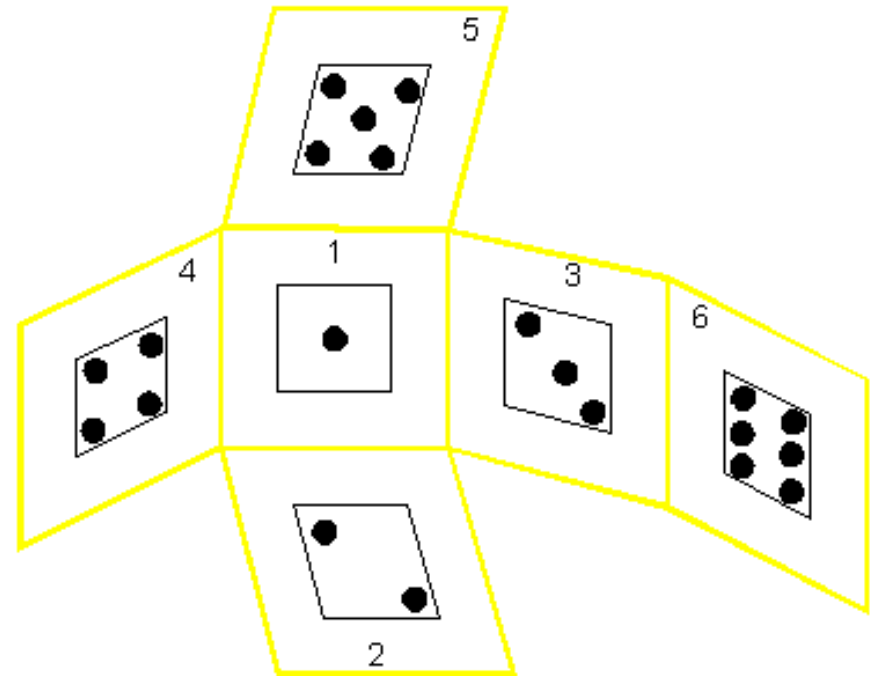
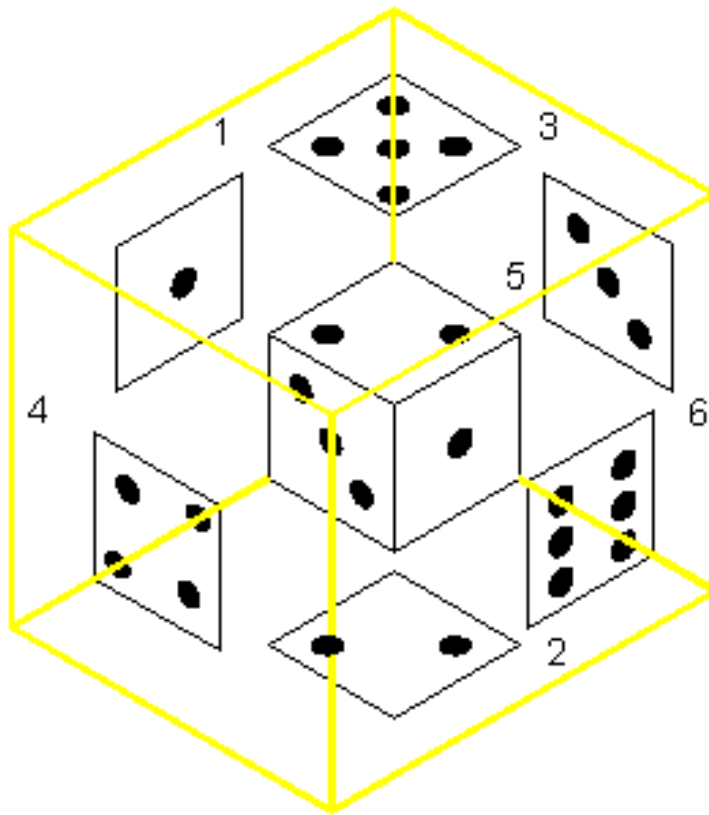
Projeção no primeiro diedro



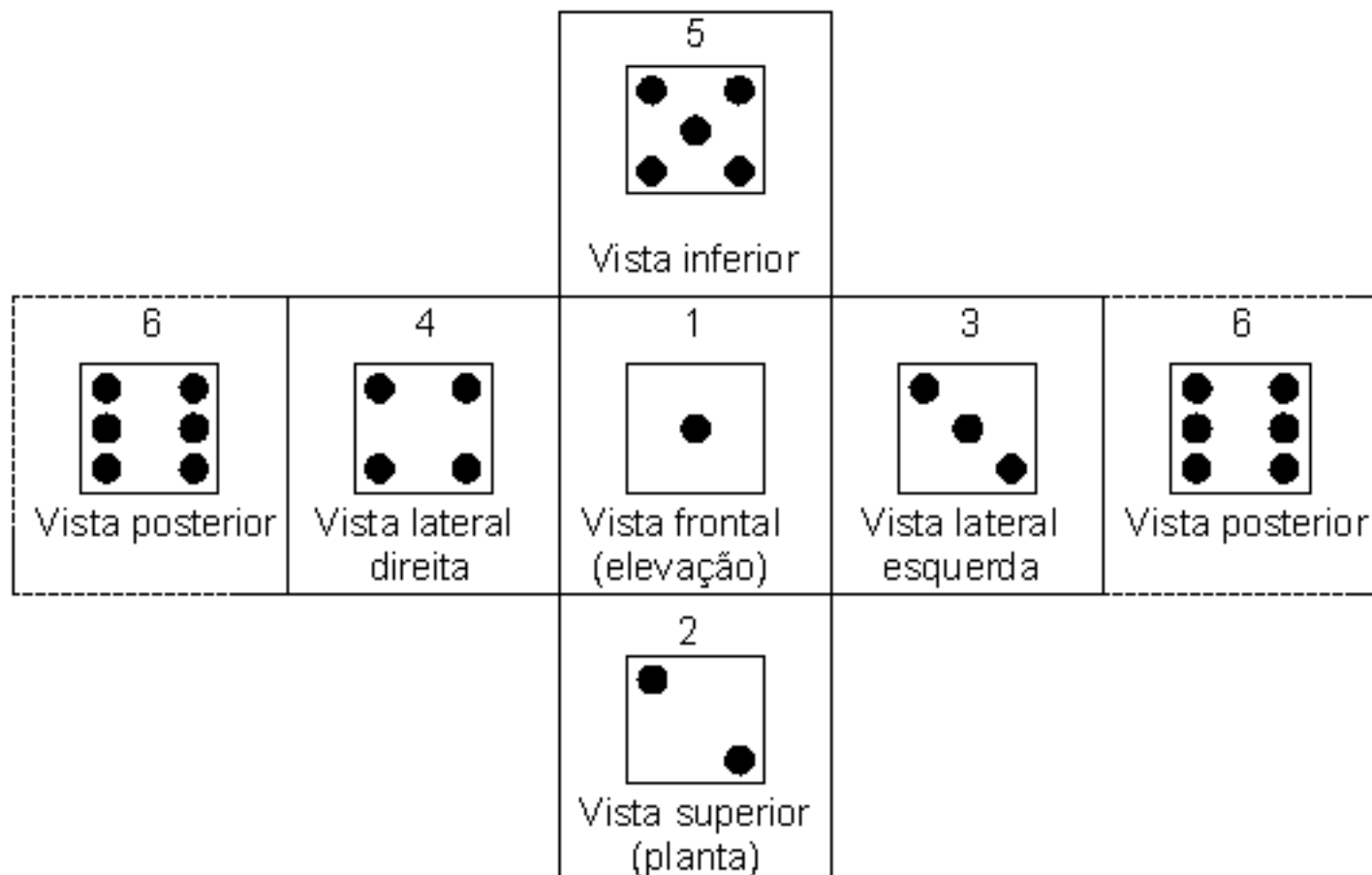
Fonte: Apostila Desenho Mecânico, v9. Projeção ortogonal. Convênio SENAI/São Paulo

Projeção ortogonal no 1º Diedro - procedimento

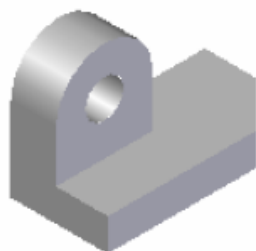
Projeção completa



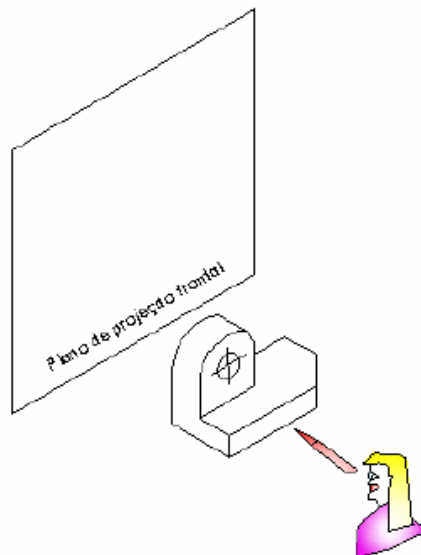
Projeção completa com o nome e posição das vistas



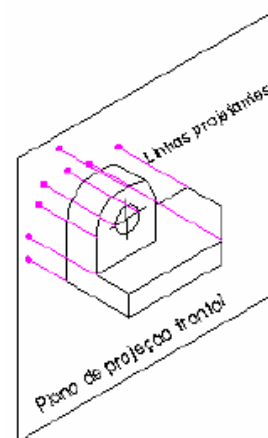
Projeção ortogonal - 1º Diedro - Vista frontal



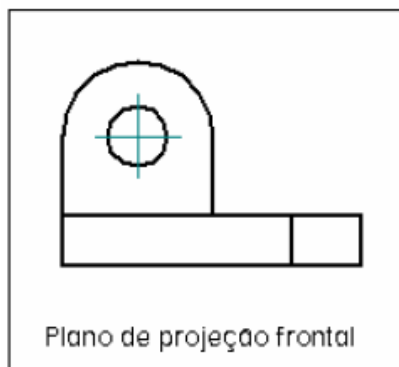
Objeto



Plano de projeção – objeto - observador

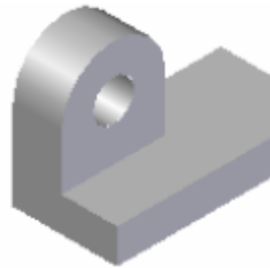


Traçam-se linhas paralelas entre si e perpendiculares ao plano de projeção.

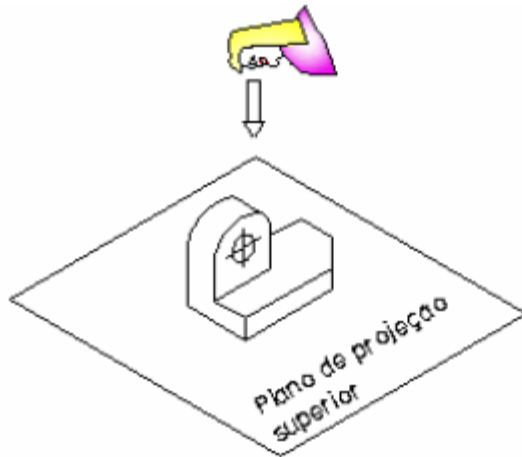


Vista frontal

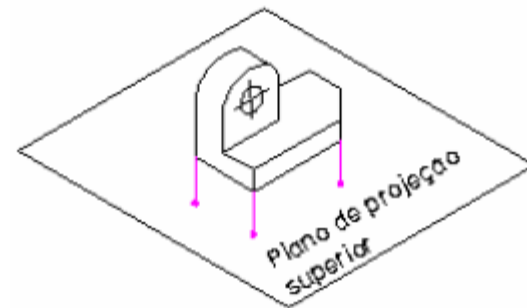
Projeção ortogonal - 1º Diedro - Vista superior



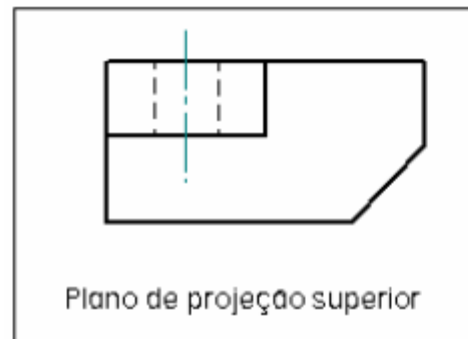
Objeto



Plano de projeção – objeto - observador



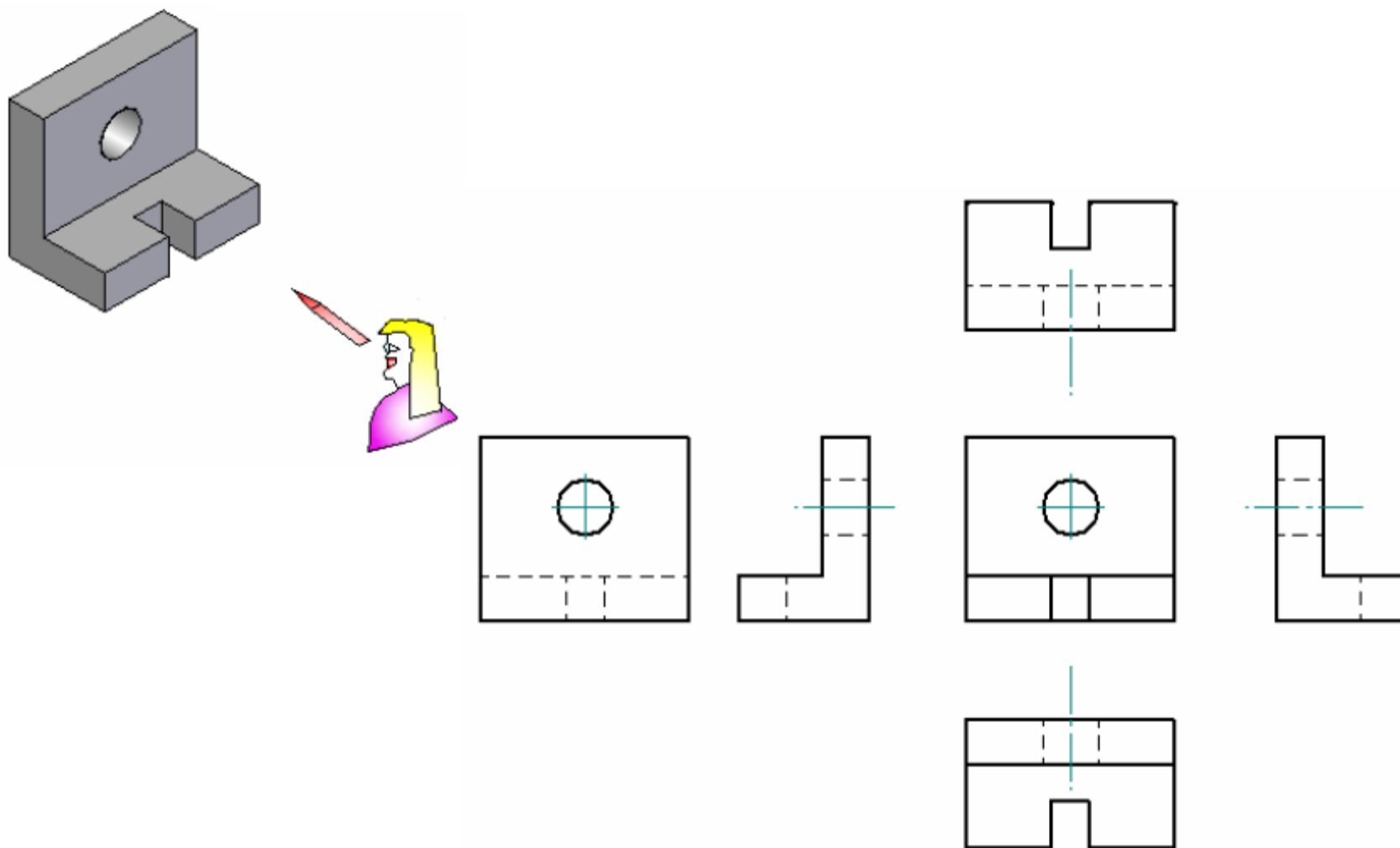
Traçam-se linhas paralelas entre si e perpendiculares ao plano de projeção.



Vista superior

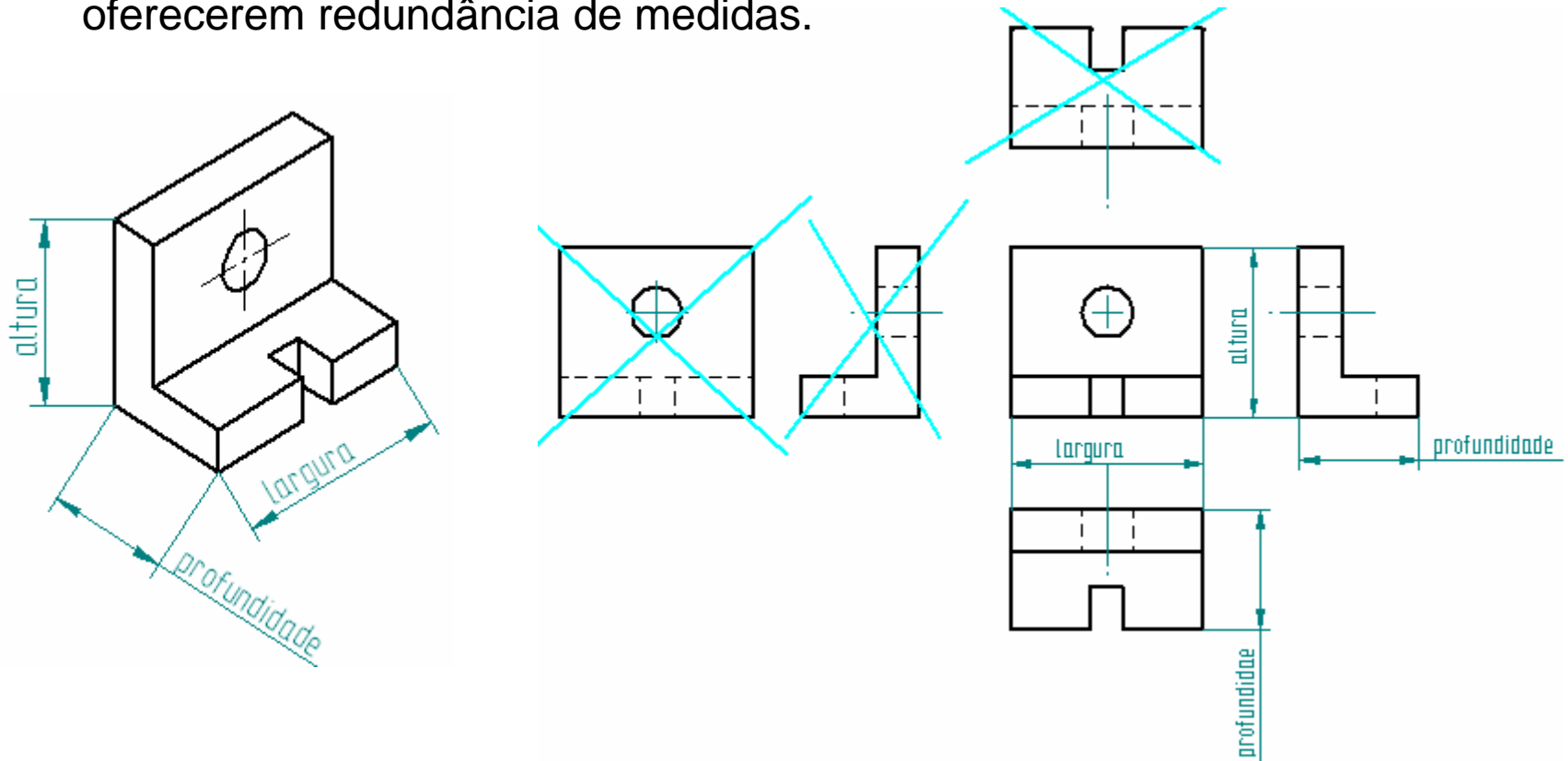
Plano de projeção superior

Projeção ortogonal - 1º Diedro



PROJEÇÕES ORTOGONAIS – Vistas Desnecessárias (1º Diedro)

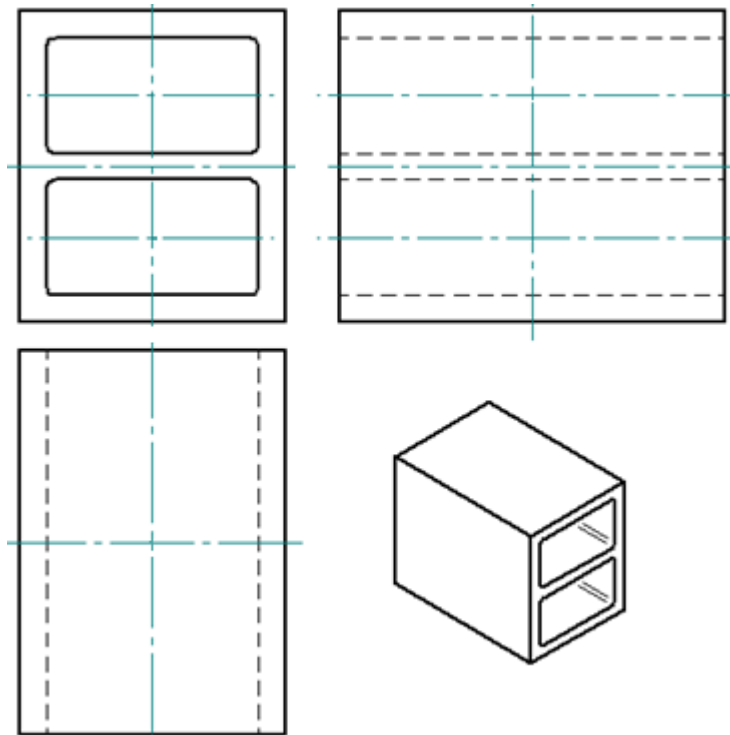
Em casos de simetria é possível descartar três das seis vistas, por oferecerem redundância de medidas.



Vistas desnecessárias pois possuem informações redundantes

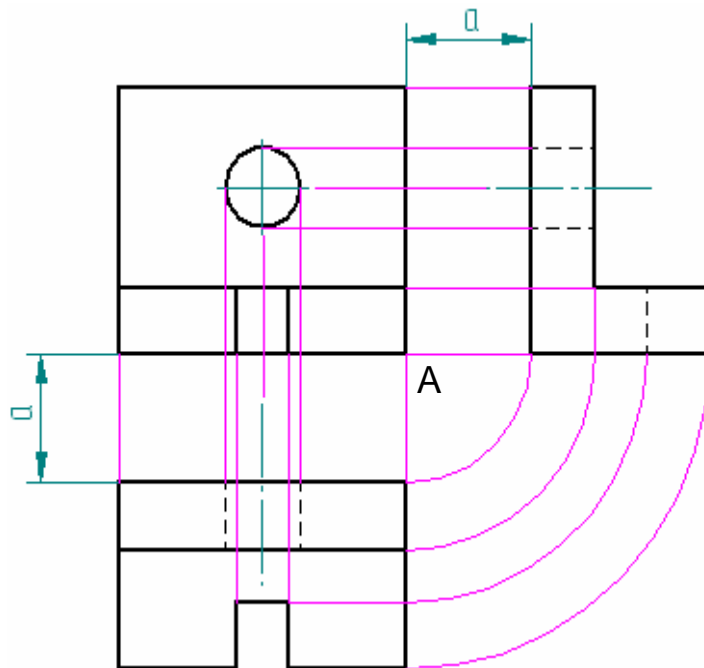
PROJEÇÕES ORTOGONAIS – Linhas de centro e simetria

Nas projeções ortogonais, quando peças simétricas, rasgos, rebaixos e furos são representados, deve-se fazer a marcação das linhas de simetria do objeto e de centro para os demais.



PROJEÇÕES ORTOGONAIS – Distância entre as vistas

Tendo em mãos uma das vistas é possível projetar as linhas que delimitam o espaço em que estarão as demais, assim como a posição de seus detalhes.



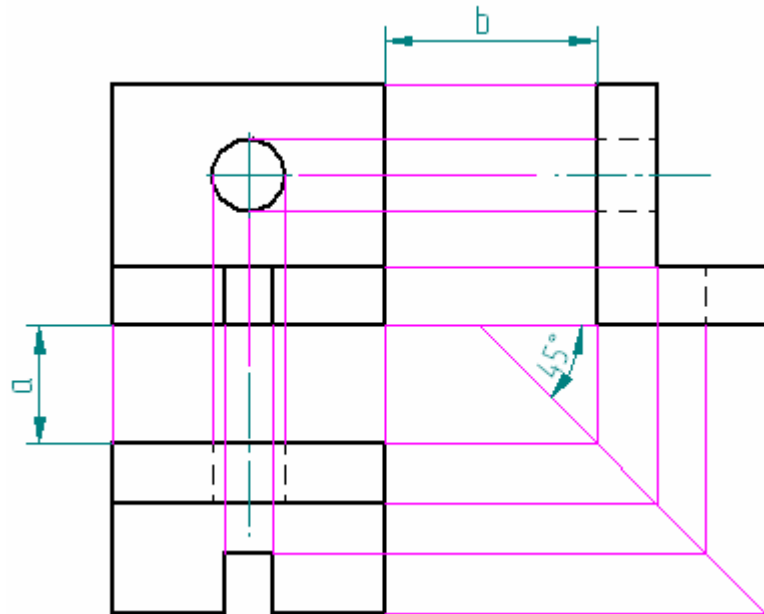
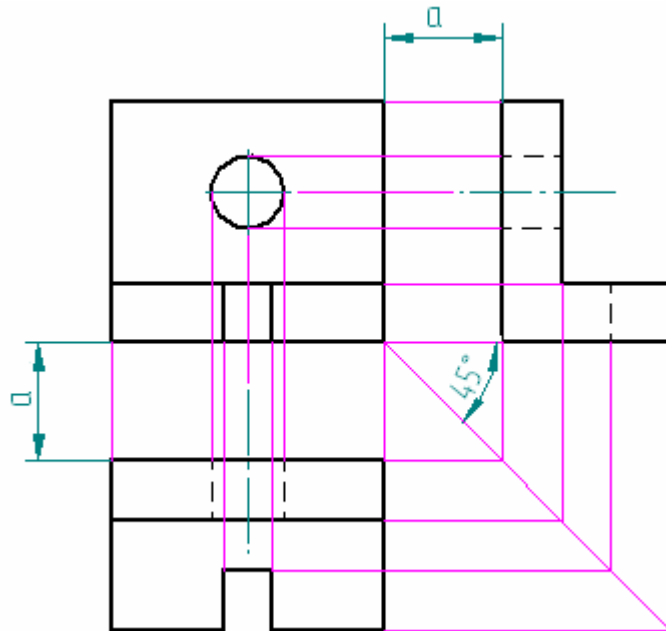
Método 1 (Compasso):

1. Fazer prolongamentos (linhas projetantes auxiliares) de bordas, limites de furos e linhas de centro da vista frontal já em mãos;
2. Traçar uma segunda vista;
3. Colocar a ponta seca do compasso no vértice A;
4. Traçar quartos de circunferência, com o grafite sobre prolongamentos da segunda vista traçada.

PROJEÇÕES ORTOGONAIS – Distância entre as vistas

Método 2 (Régua) :

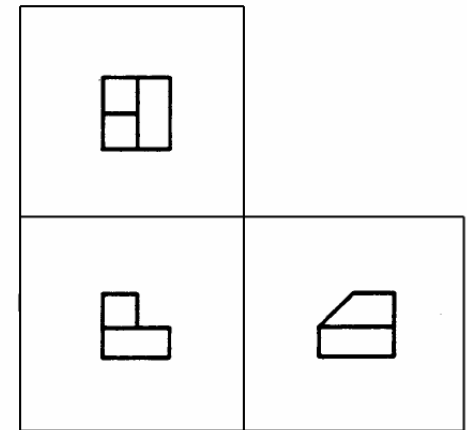
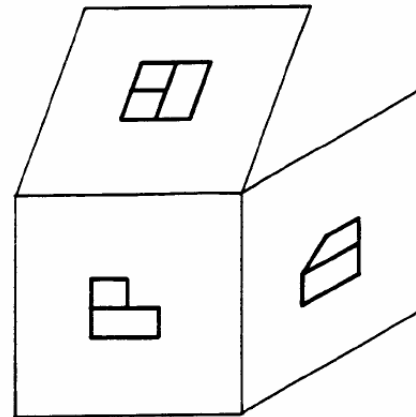
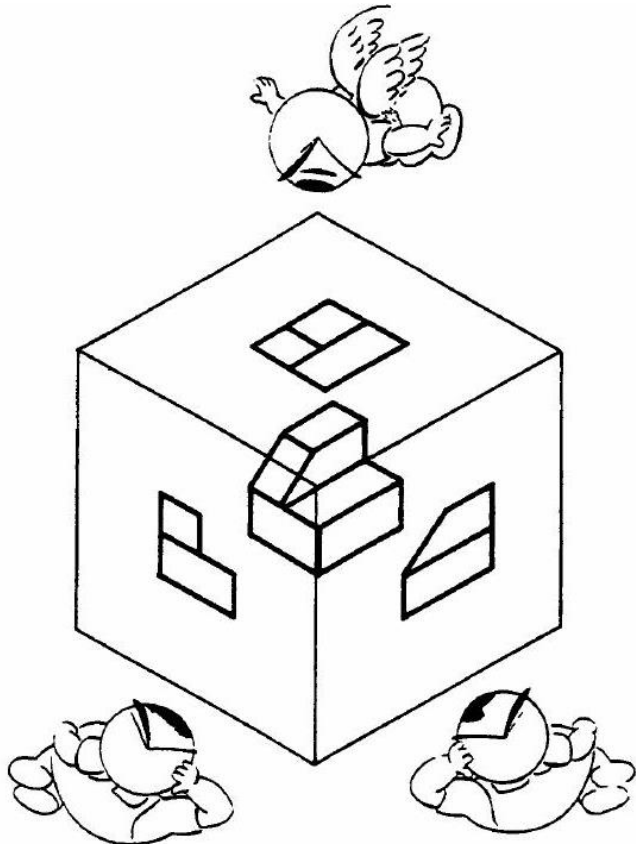
1. Traçar uma reta a 45° com a horizontal
2. Estender as linhas de uma vista até tocar a linha inclinada
3. Projetá-las na outra vista até a altura correta.



Projeção ortogonal no 3º Diedro - Procedimento

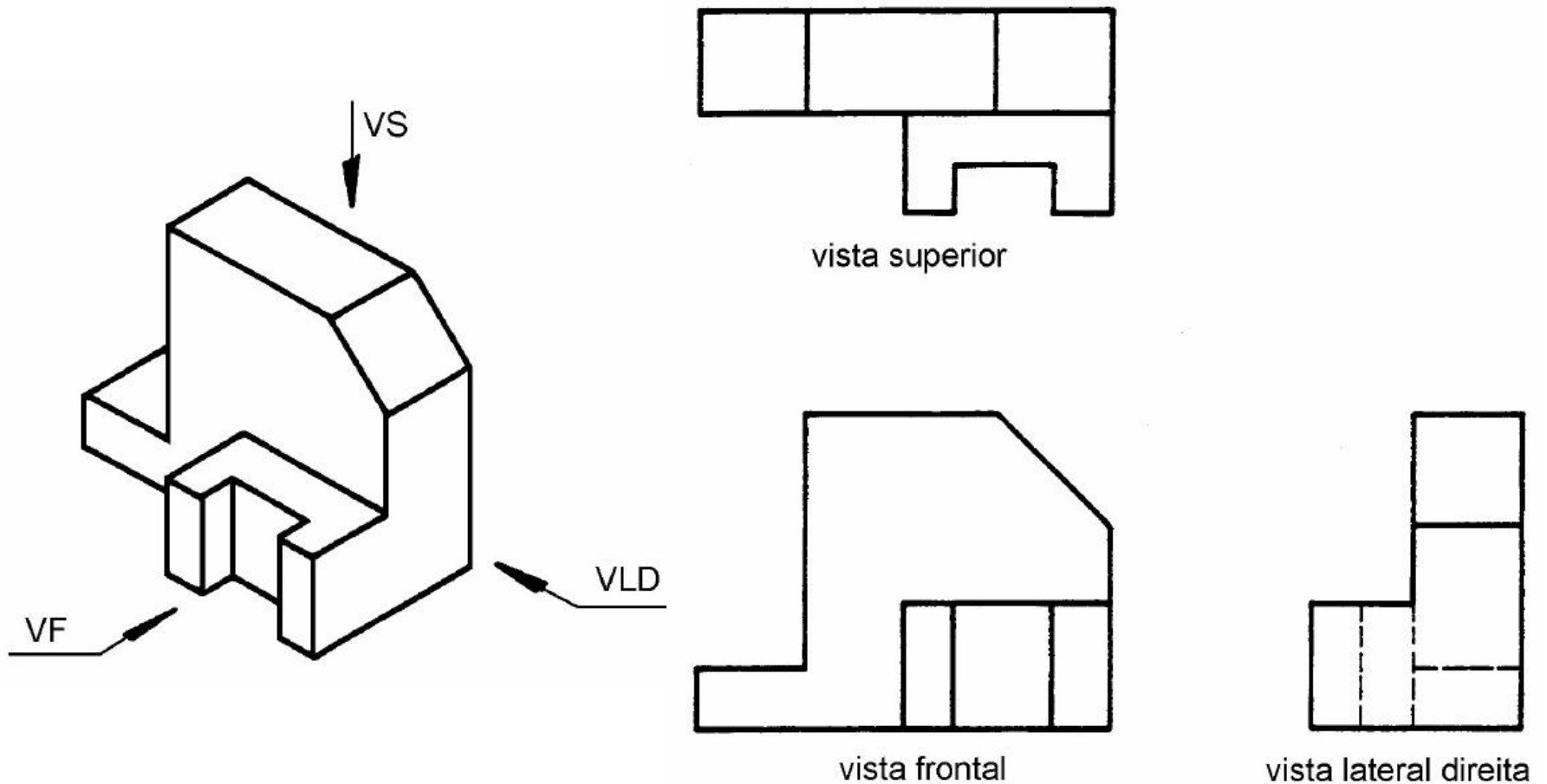
Objeto: bloco de madeira

Projeção no terceiro diedro



Fonte: Apostila Desenho Mecânico. Desenho com instrumentos. Convênio SENAI/São Paulo

Projeção ortogonal no 3º Diedro - Exemplo

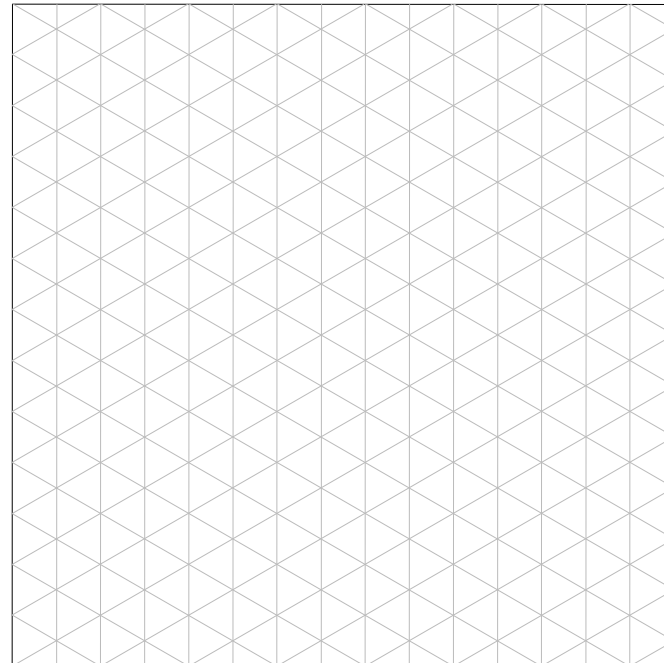
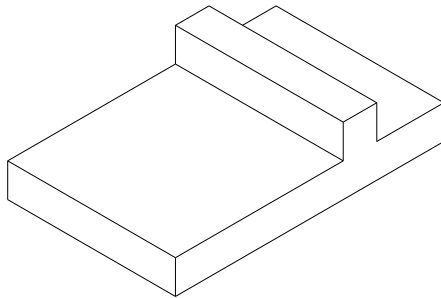


Fonte: Apostila Desenho Mecânico, v9. Projeção ortogonal. Convênio SENAI/São Paulo

Exercício 2.01 – Desenhe a perspectiva isométrica

Nome: _____

Nº _____ Turma _____

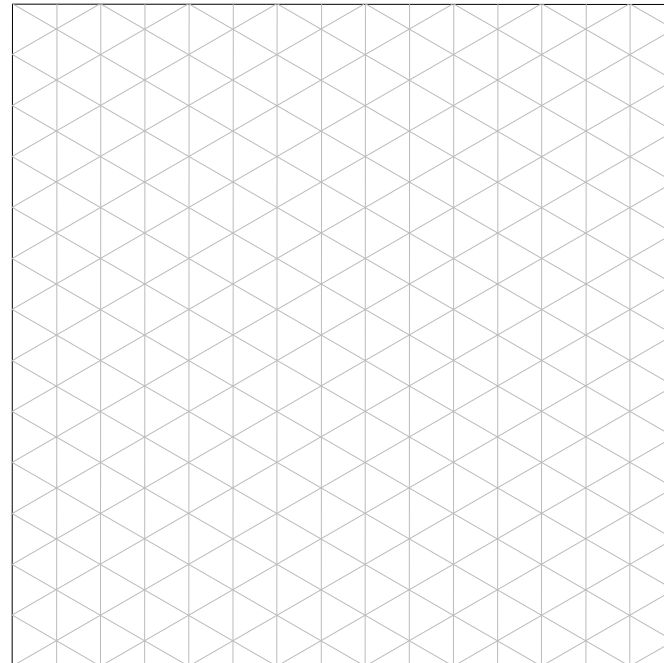
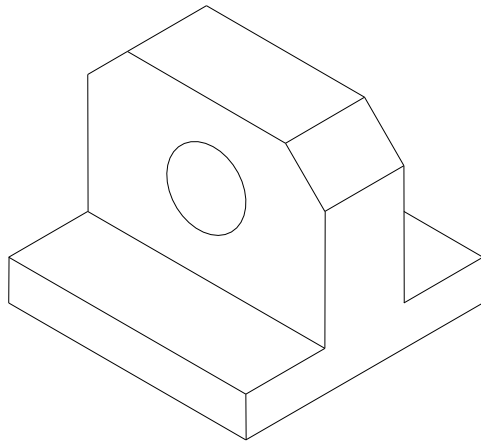


Fonte: Apostila Desenho Mecânico, v9. Projeção ortogonal. Convênio SENAI/São Paulo

Exercício 2.02 – Desenhe a perspectiva isométrica

Nome: _____

Nº _____ Turma _____

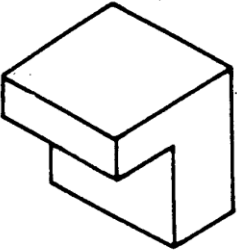
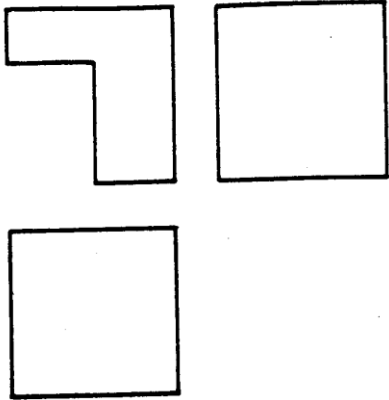
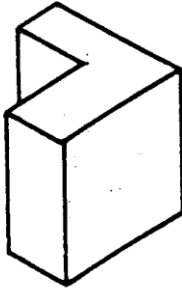
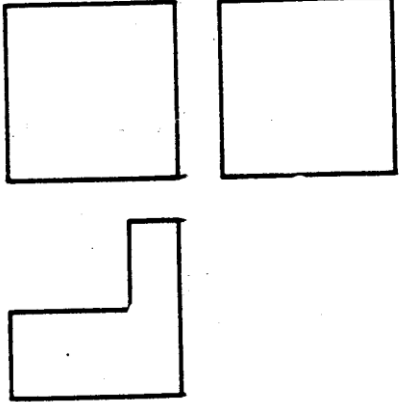
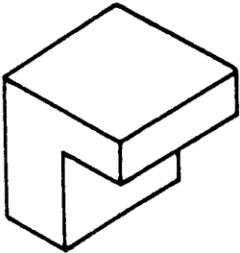
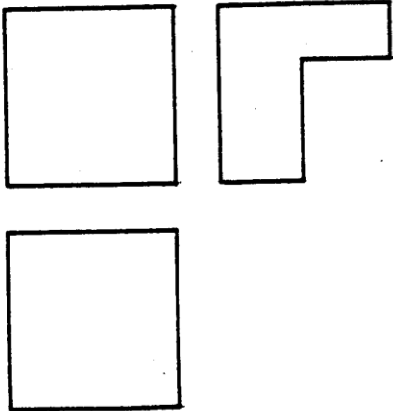
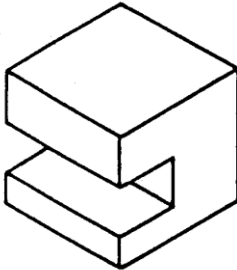
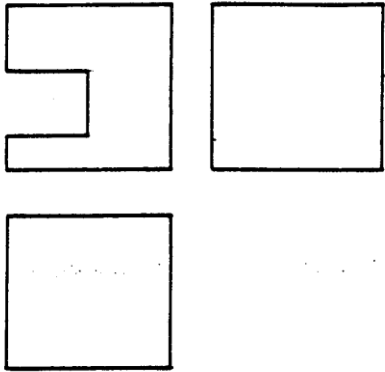


Fonte: Apostila Desenho Mecânico, v9. Projeção ortogonal. Convênio SENAI/São Paulo

Exercício 2.03 – COMPLETE AS PROJEÇÕES

Nome: _____

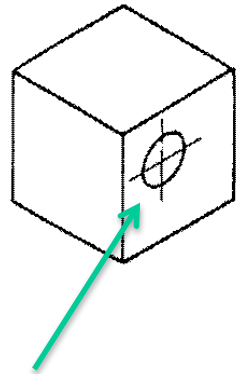
Nº _____ Turma _____

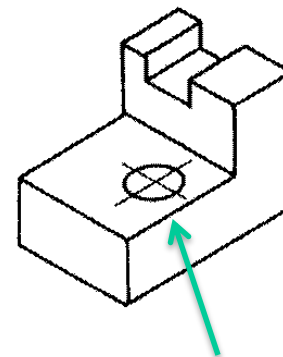
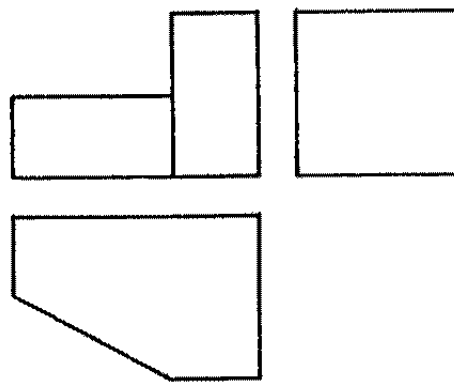
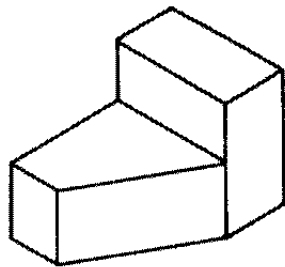
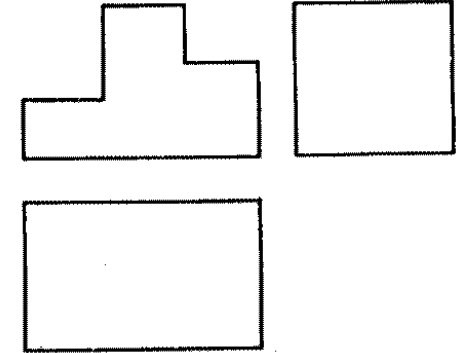
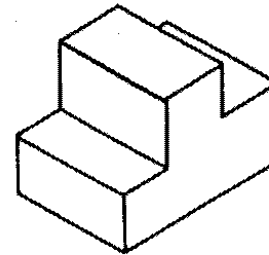
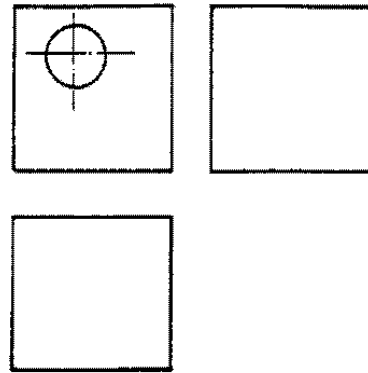
Exercício 2.04 – COMPLETE AS PROJEÇÕES

Nome: _____

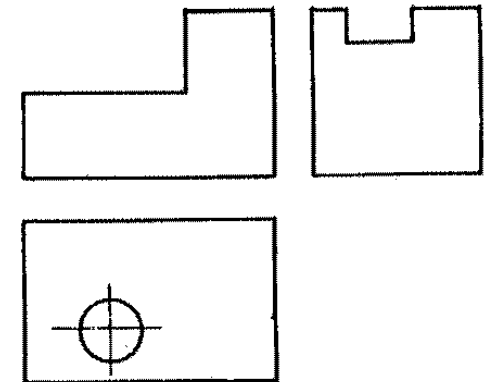
Nº _____ Turma _____



Furo Passante



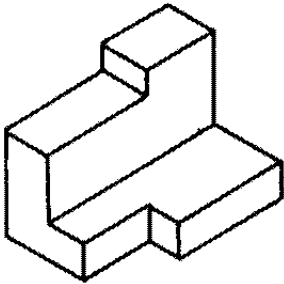
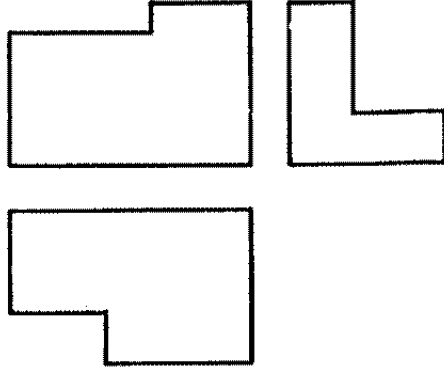
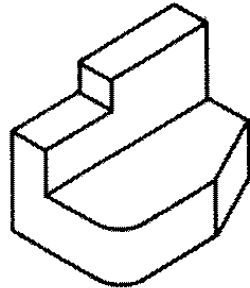
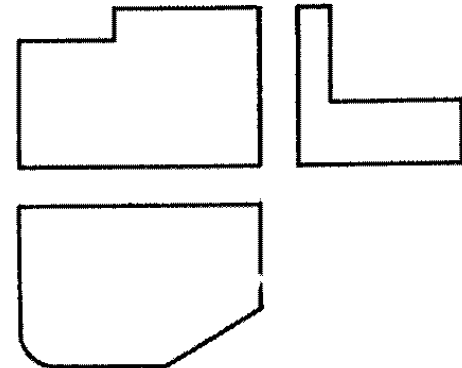
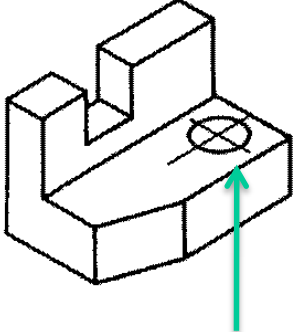
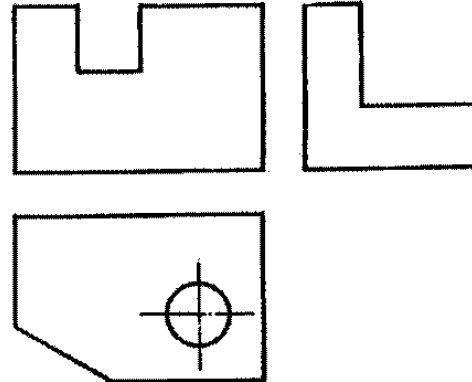
Furo Passante



Exercício 2.05 – COMPLETE AS PROJEÇÕES

Nome: _____

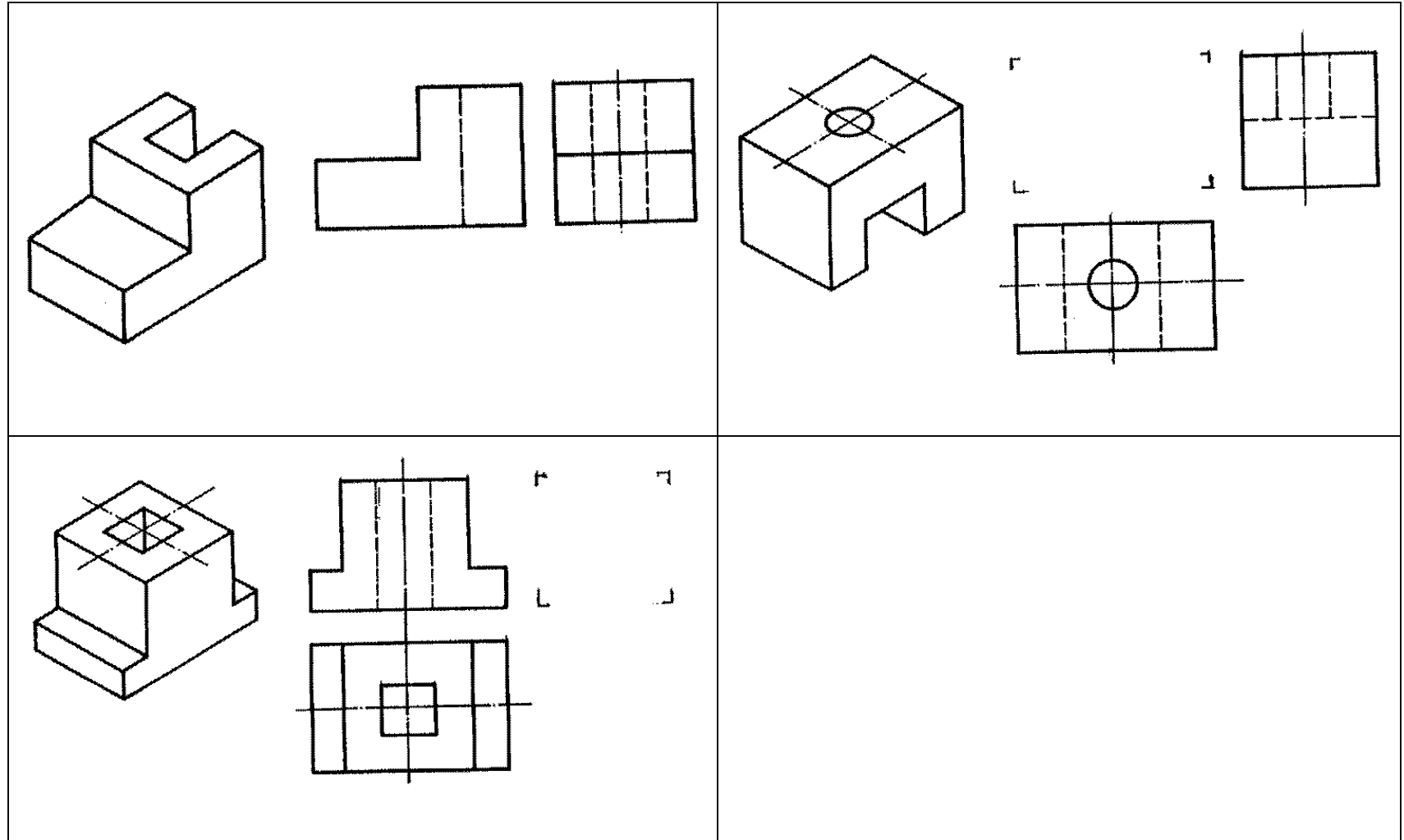
Nº _____ Turma _____

 	 
 <p>Furo Passante</p> 	Empty space for student to draw the projections of the third object

Exercício 2.06 – DESENHE A VISTA QUE FALTA

Nome: _____

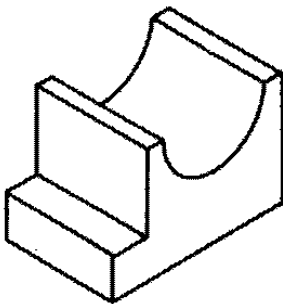
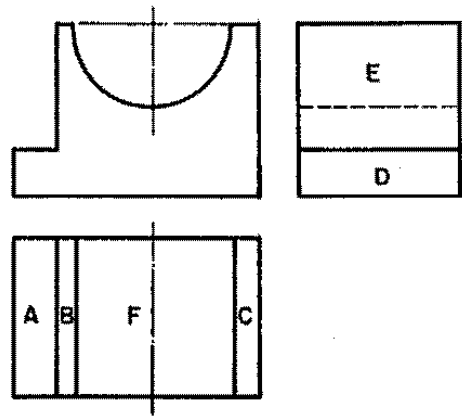
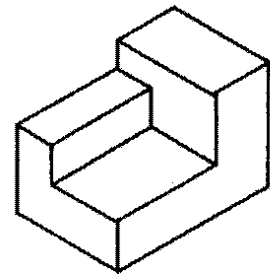
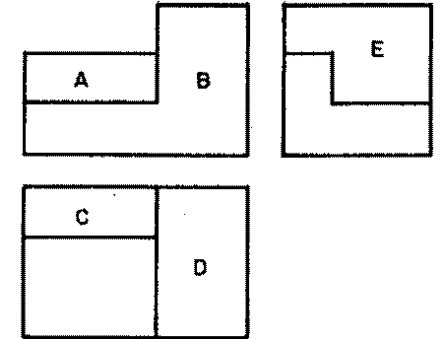
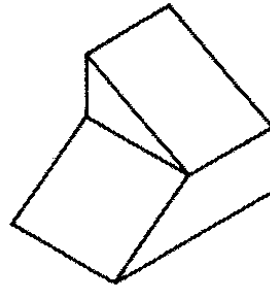
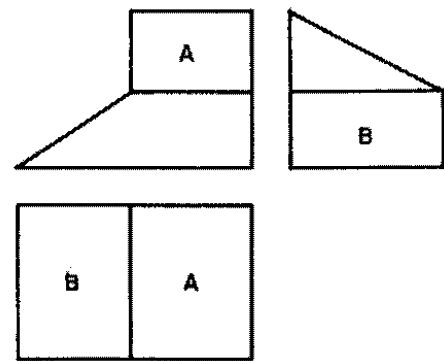
Nº _____ Turma _____



Exercício 2.07 – Desenhe na perspectiva isométrica as letras correspondentes.

Nome: _____

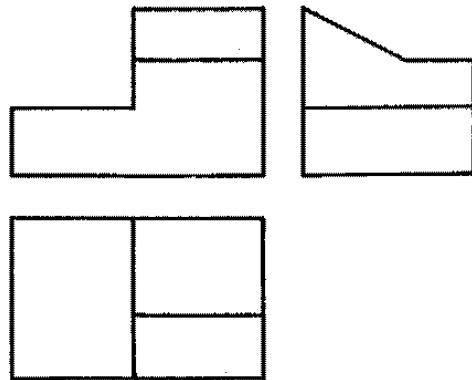
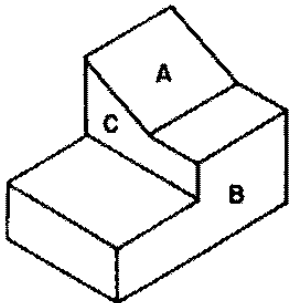
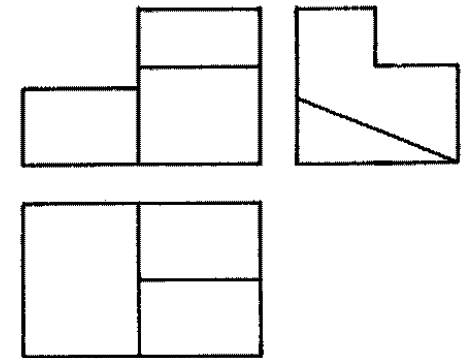
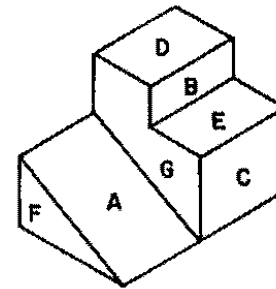
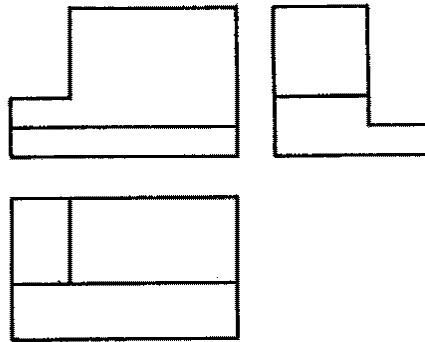
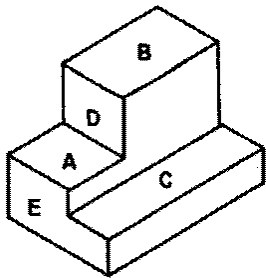
Nº _____ Turma _____

Exercício 2.08 – Desenhe nas vistas as letras correspondentes às da perspectiva isométrica.

Nome: _____

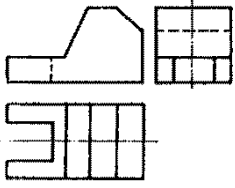
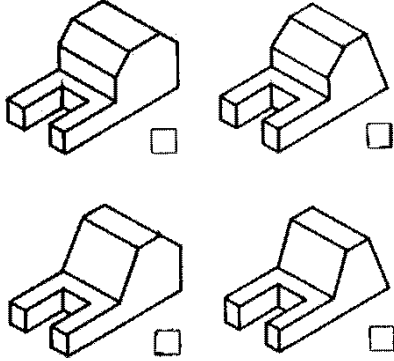
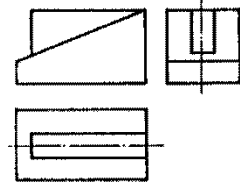
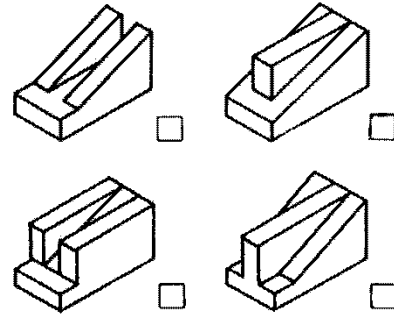
Nº _____ Turma _____



Exercício 2.09 – Desenhe nas vistas as letras correspondentes às da perspectiva isométrica.

Nome: _____

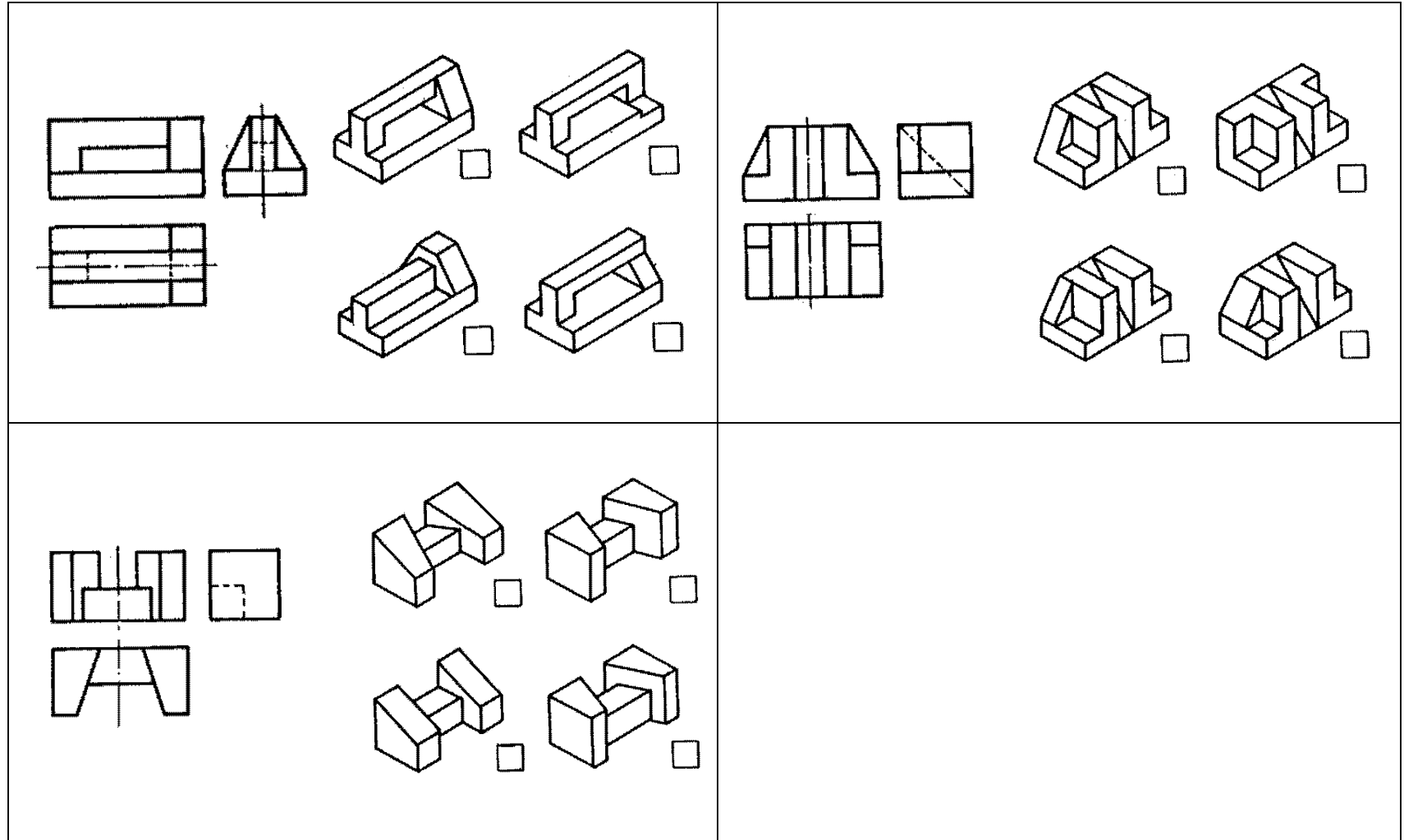
Nº _____ Turma _____

Exercício 2.10 – Selecione a correta perspectiva isométrica.

Nome: _____

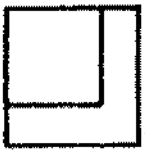
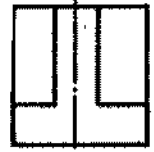
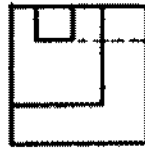
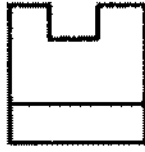
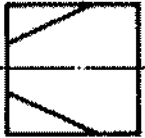
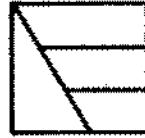

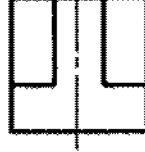
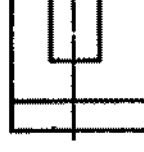

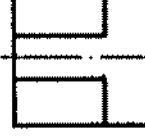
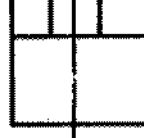
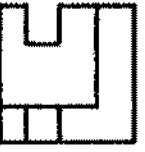
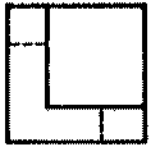
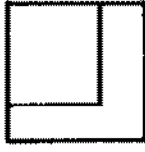
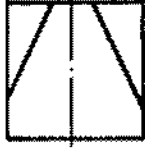
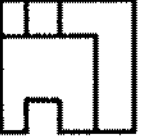
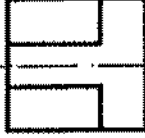
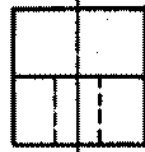
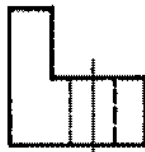
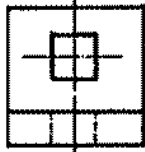
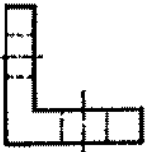
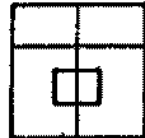
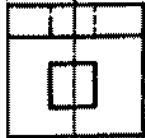
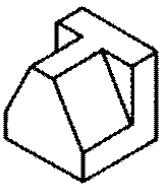
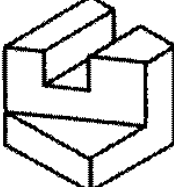
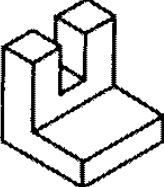
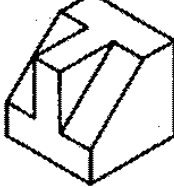
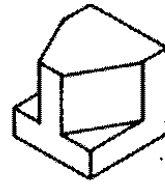
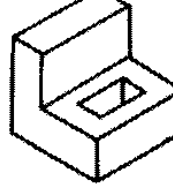
Nº _____ Turma _____



Exercício 2.11 – Assinale os números correspondentes.

Nome: _____

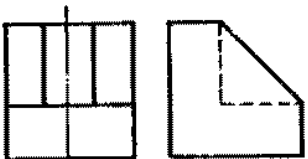
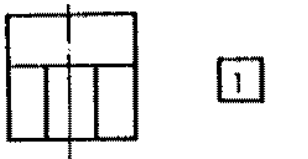
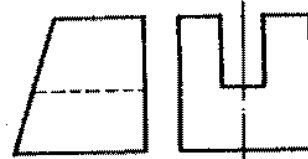
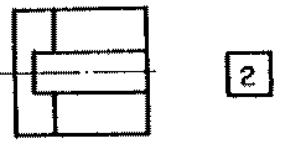
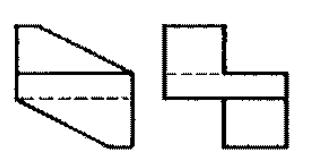
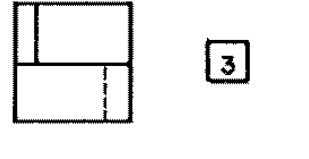
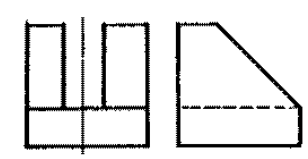
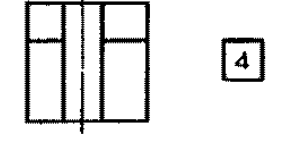

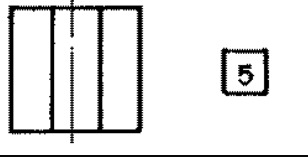
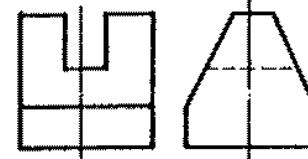
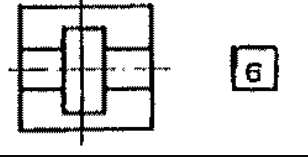
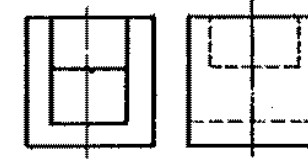
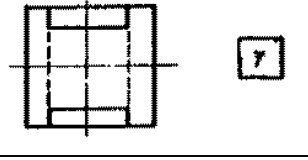
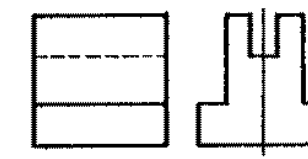
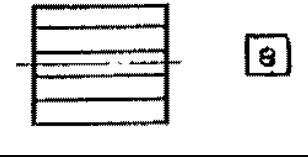
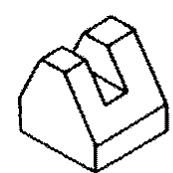
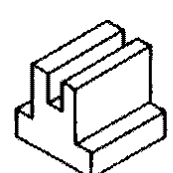
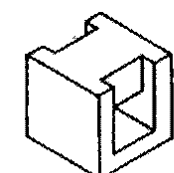
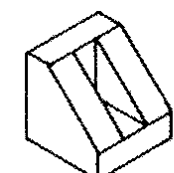
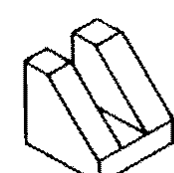
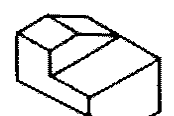
Nº _____ Turma _____

      <div style="display: flex; justify-content: space-around; width: 100%;"> <div>1</div> <div>2</div> </div>	      <div style="display: flex; justify-content: space-around; width: 100%;"> <div>3</div> <div>4</div> </div>
      <div style="display: flex; justify-content: space-around; width: 100%;"> <div>5</div> <div>6</div> </div>	      <div style="display: flex; justify-content: space-around; width: 100%;"> <div>7</div> <div>8</div> </div>
     	

Exercício 2.12 – Assinale os números correspondentes.

Nome: _____

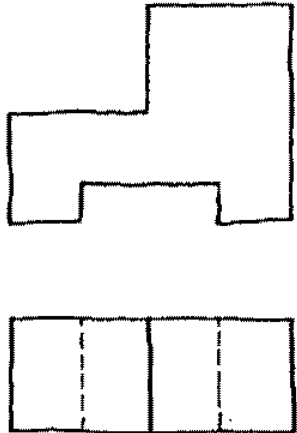
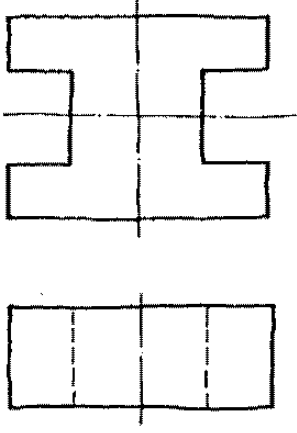
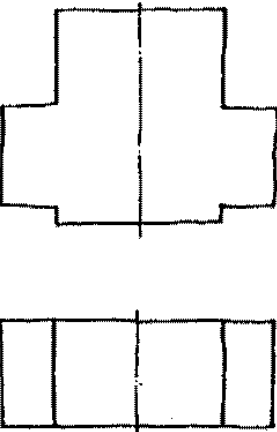
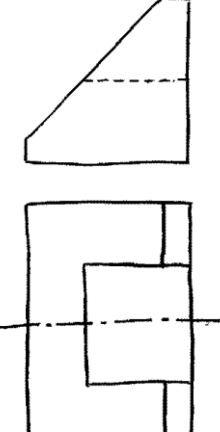
Nº _____ Turma _____

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<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;">   <div style="border: 1px solid black; padding: 2px; width: 20px; margin: 0 auto;">5</div> </div> <div style="text-align: center;">   <div style="border: 1px solid black; padding: 2px; width: 20px; margin: 0 auto;">6</div> </div> </div>	<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;">   <div style="border: 1px solid black; padding: 2px; width: 20px; margin: 0 auto;">7</div> </div> <div style="text-align: center;">   <div style="border: 1px solid black; padding: 2px; width: 20px; margin: 0 auto;">8</div> </div> </div>
<div style="display: flex; justify-content: space-around; align-items: center;">  <div style="border: 1px solid black; width: 15px; height: 15px; margin: 0 10px;"></div>  <div style="border: 1px solid black; width: 15px; height: 15px; margin: 0 10px;"></div>  <div style="border: 1px solid black; width: 15px; height: 15px; margin: 0 10px;"></div>  <div style="border: 1px solid black; width: 15px; height: 15px; margin: 0 10px;"></div>  <div style="border: 1px solid black; width: 15px; height: 15px; margin: 0 10px;"></div>  <div style="border: 1px solid black; width: 15px; height: 15px; margin: 0 10px;"></div> </div>	

Exercício 2.13 – Complete as projeções desenhando a lateral esquerda à mão livre.

Nome: _____

Nº _____ Turma _____

Exercício 2.14 – Complete as projeções desenhando a vista superior à mão livre.

Nome: _____

Nº _____ Turma _____

