











Çizgiler ve anlamları

Teknik çizimde farklı özelliklerde ve kalınlıklarda çizgiler kullanılır.

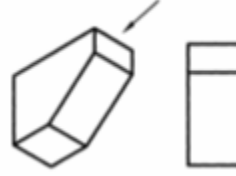
Standartlarda tanımlanmış olan her bir çizgi tipinin kendine ait özel bir anlamı vardır.

Bir teknik resim çiziminde gerçek (cisme ait) yüzey ve köşelerin çiziminde kullanılan ana çizgi ve gerçekte var olmayan ancak resmi açıklayıcı çizgiler yardımcı çizgiler olarak bulunur.

Çizgi çeşitleri	Çizgi grupları				Kullanım yerleri
	1.0	0.7	0.5	0.35	
A  Kalın sürekli çizgi	1.0	0.7	0.5	0.35	Görünen çevreler ve keskin kenarlar
B  İnce sürekli çizgi	0.5	0.35	0.25	0.18	Keskin olmayan birleşme çizgileri, ölçü çizgisi, bağlama çizgisi, kılavuz çizgisi, tarama çizgisi, kısa eksen, yerinde döndürülmüş kesit çevresi, vida diş dibi çizgisi,
C  Serbest el çizgisi	0.5	0.35	0.25	0.18	Görünüş veya kesit sınırlayan çizgi, koparılmış görünüş çizgisi
D  Zig zag çizgi					
E  Kesikli çizgi	1.0	0.7	0.5	0.35	Görünmeyen çevreler ve kenarlar
F  Kesikli çizgi	0.5	0.35	0.25	0.18	
G  Eksen çizgisi	0.5	0.35	0.25	0.18	Eksen, simetri düzlemi, taksimat daresi, dişli çark taksimat daresi çapı, yörünge, delik eksen daresi,
H  Kesit düzlemi çizgisi	0.5	0.35	0.25	0.18	Kesit görünüşlerini tanımlayan çizgi
	1.0	0.7	0.5	0.25	
J  İki kesikli çizgi	0.5	0.35	0.25	0.18	Komşu parça çevresi, hareketli parçanın sınır konumu, ağırlık merkezi, şekillendirilmiş parçaların başlangıç çevreleri, kesit düzlemlerinin önünde bulunan kısımlar
K  Kalın eksen çizgisi	1.0	0.7	0.5	0.35	Ek işlem veya özel işlem gereken yerleri belirten çizgi

Kalın Sürekli çizgi

- Teknik resim çizimlerinde görünen kenarları ve parçaların dış çevresini ifade eder.
- Sürekli çizgilerin köşeleri keskin olmalıdır.
- Kalınlığı 0.5 mm

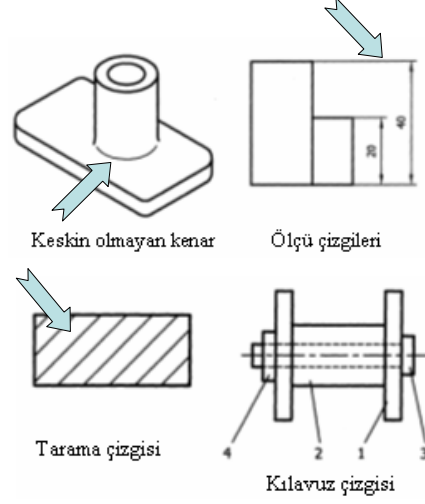


Kalın Sürekli çizgi

	HATALI	DOĞRU
A		
B		
C		

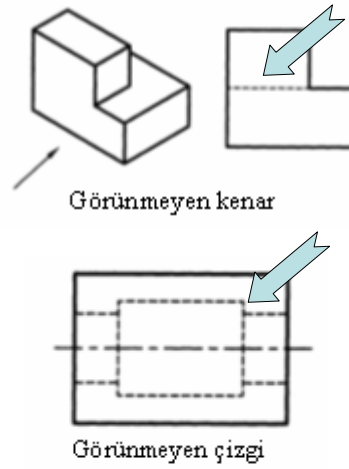
İnce sürekli çizgi

- yardımcı çizgilerdir
- Keskin olmayan kenarlar, ölçüler için, kılavuz çizgiler için kullanılır
- 0.25 mm kalınlıkta



Kesikli çizgiler

- Parçanın içinde bulunan boşlukları veya bakış yönünden görülemeyen çıkıntıların çiziminde kullanılan çizgi tipidir.
- 0.25 mm kalınlıkta



	HATALI	DOĞRU
Kesikli çizgiler sürekli ve homojen olmalıdır		
İki kesikli çizgi, paralel olarak çizilecekse, birbirinden kaçık olmalıdır.		
İki kesikli çizgi bir noktada birleşiyorsa, birleştirilirler. Kesik çizgi ikinci bir kesik çizgiden başlamalıdır.		
Kesikli çizgi, sürekli kalın çizgiden başlıyorsa, sürekli çizgiye birleştirilir. Eğer sürekli çizginin devamı olarak çizilecekse, araya bir boşluk bırakılır.		

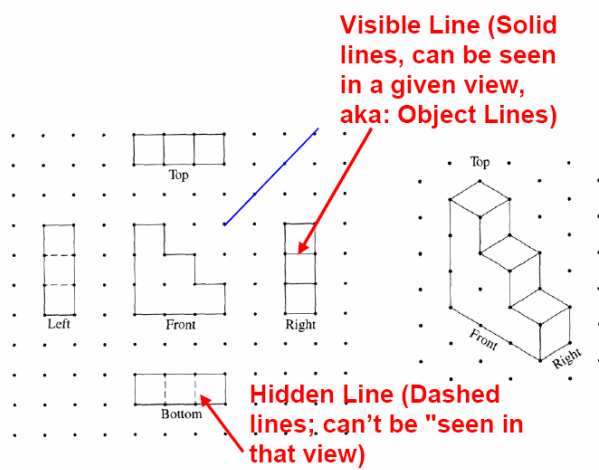
Hidden Lines

You should follow at least three general practices when drawing hidden lines to help



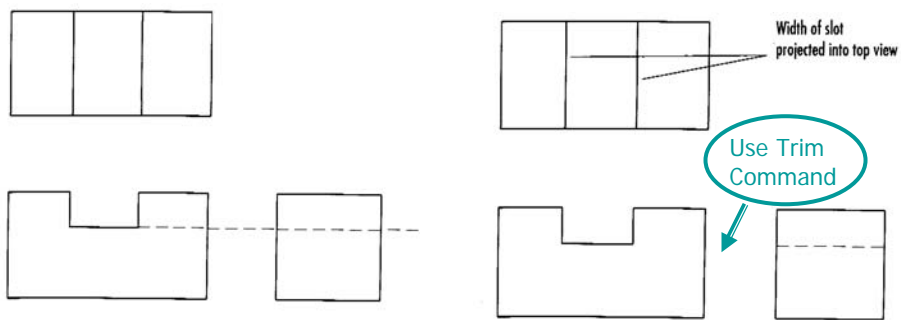
- ❖ prevent confusion and to make the drawing easier to read.
- ❖ clearly show intersections using intersecting line segments clearly show corners, using intersecting line segments
- ❖ leave a noticeable gap between aligned continuous lines and hidden lines

Hidden Lines



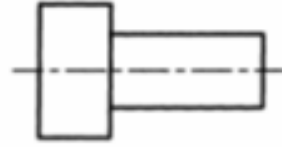
Hidden Lines

Hidden lines are usually drawn in a different color than the one used for the continuous object lines. This practice helps distinguish the different types of lines and makes them easier to interpret.

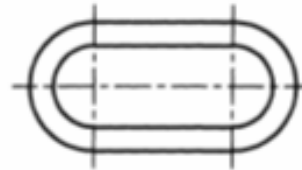


Eksen çizgisi

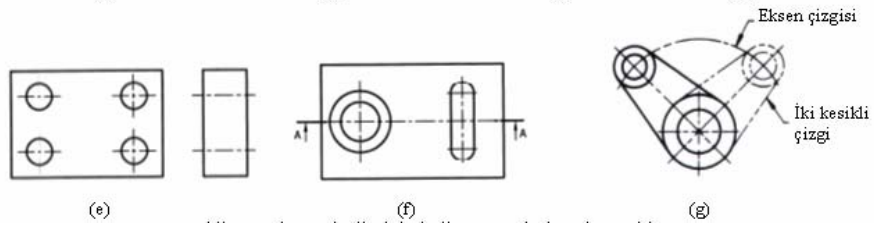
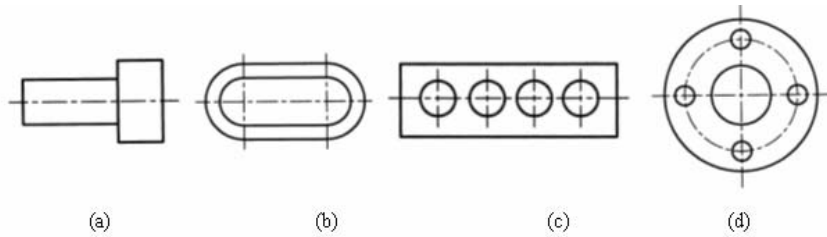
- bir yayın ve çemberin merkezini, silindirin eksenlerini, koni veya dairesel kesite sahip parçaların simetri çizgisini temsil eder.
- Ayrıca parçanın yörüngesini ve hareket yolunu, taksimatını gösterir.
- 0.25 mm kalınlıktadır


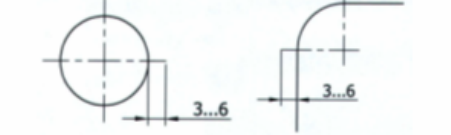

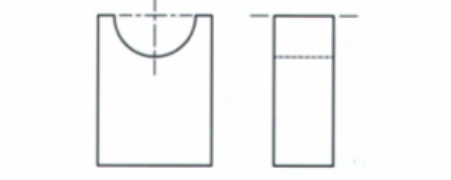


Eksen çizgisi



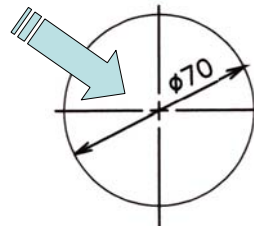
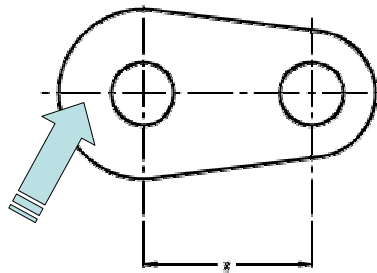
Simetri düzlemi



Eksen çizgilerinde uzun çizgilerden sonra kısa çizgi kullanılmalı ve eksen çizgisi boyunca çizgilerin boyları değişmemelidir.	
Çember ve yayların çiziminde, eksen çizgileri geometriden 3...6 mm taşarak çizilmelidir.	
Çapı 12 mm den küçük olan çemberin veya 12 mm den küçük boyuta sahip dörtgenlerin simetri eksenleri için ince sürekli çizgi kullanılır.	
Sürekli çizgi ile birleştirilmemeli, arada boşluk bırakılmalıdır.	

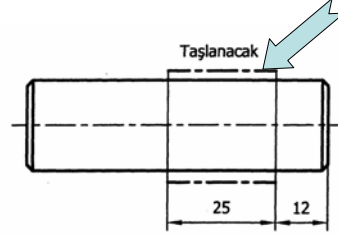
Centerlines

You will draw the centerlines for the circle. Center lines for holes must be included in all views. A centermark and four lines extending beyond the four quadrant points are used to define the center point of a hole in its circular view.



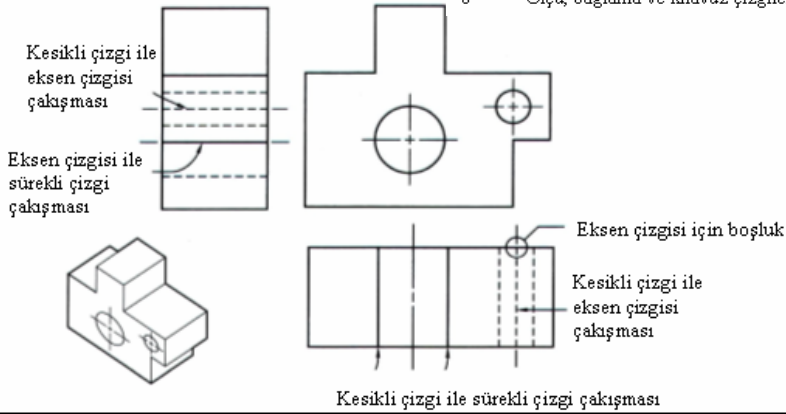
Kalın eksen çizgisi

- Ek işlem gereken yerler için kullanılır
- 0.5 mm kalınlıktadır



Çizgilerin çakışmasında öncelik

1	Görünen çevre çizgileri ve kenarları	A
2	Görünmeyen çevre çizgileri ve kenarları	F
3	Kesit düzlemleri çizgileri	H
4	Eksen çizgileri	G
5	Ağırlık merkezi ve çizgileri	J
6	Ölçü, bağlama ve kılavuz çizgileri	B

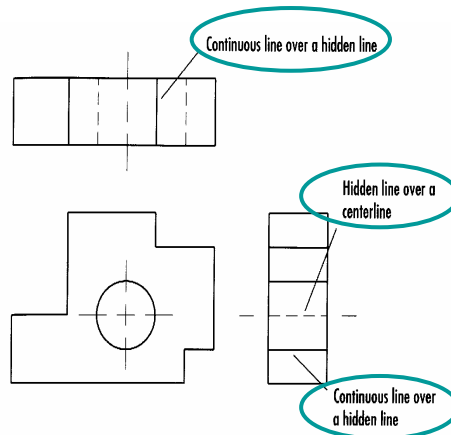


Line Precedence

Different types of lines often align with each other within the same view.

The rule is that continuous lines take precedence over hidden lines, and hidden lines take precedence over centerlines.

If you show the short end segments were a centerline would extend, be sure to leave a gap.



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Adjusting Linetype Scale

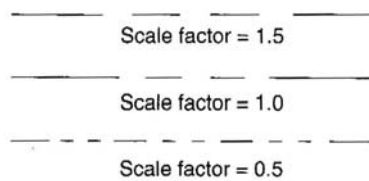
The linetype scale determines the relative length of dashes in linetypes such as hidden and center lines. Setting a linetype scale ensures that the lines you draw are represented properly on the screen and when the drawing is plotted.

Command : **LTSCALE**

Enter new linetype scale factor <1.000> : **0.5**

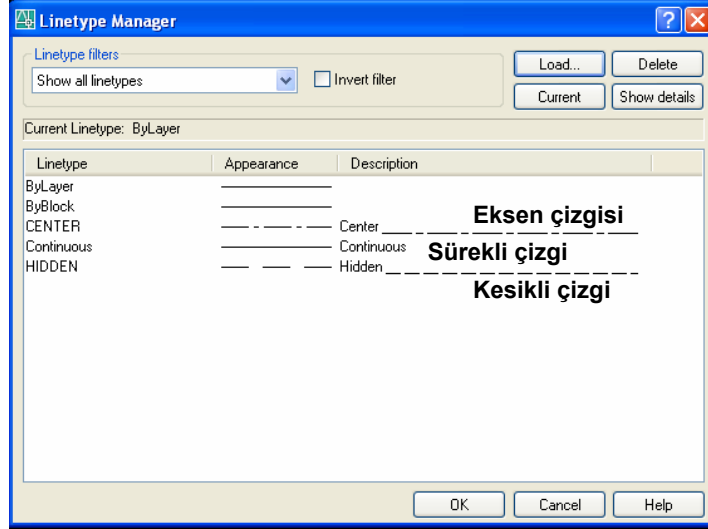
Regenerating model.

Command :

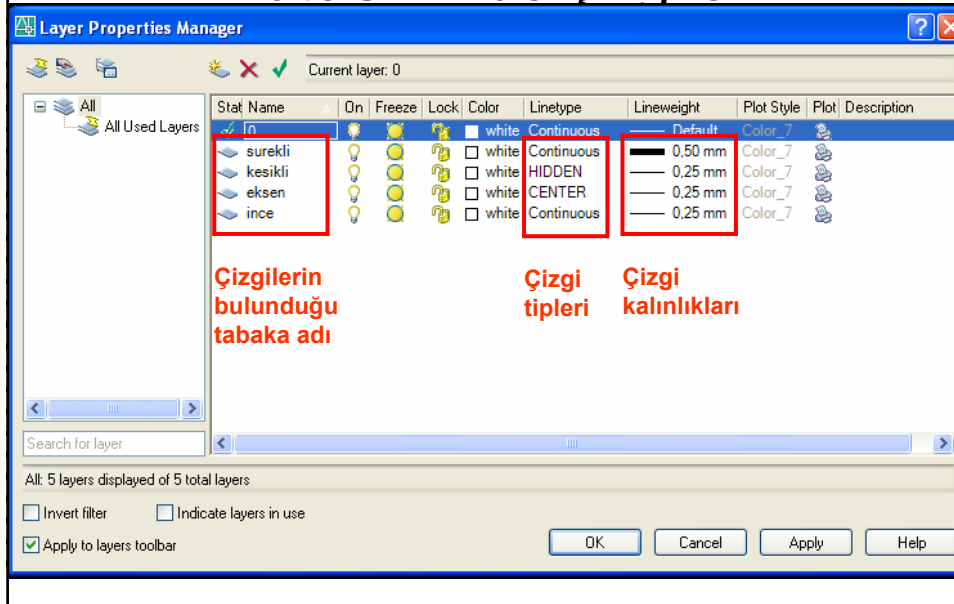


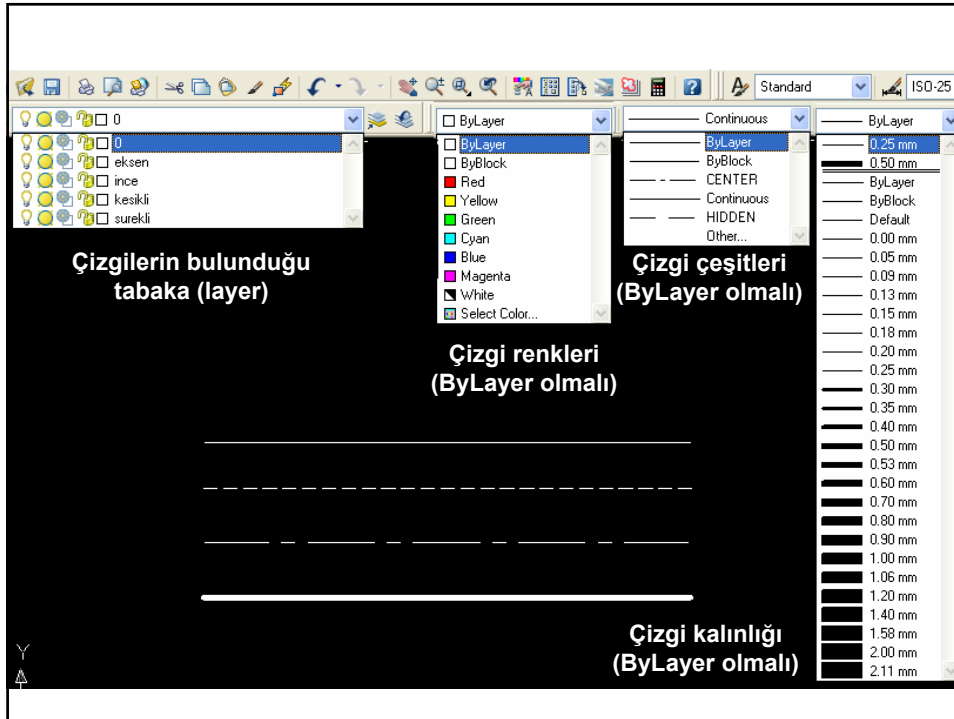
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AutoCAD de çizgiler

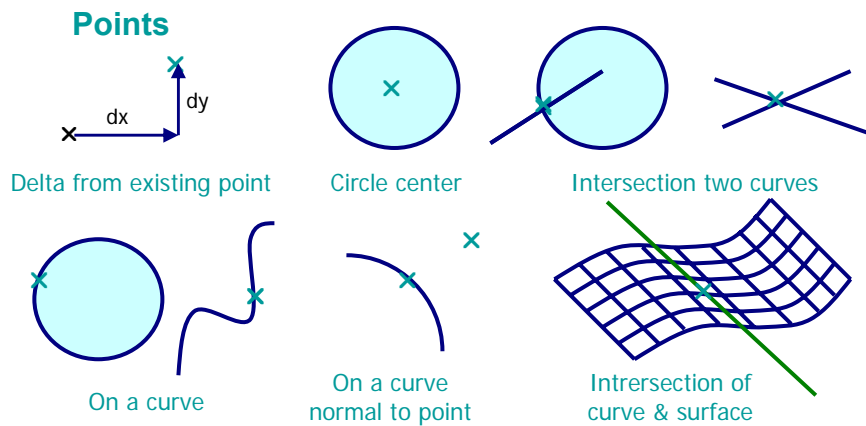


AutoCAD de çizgiler



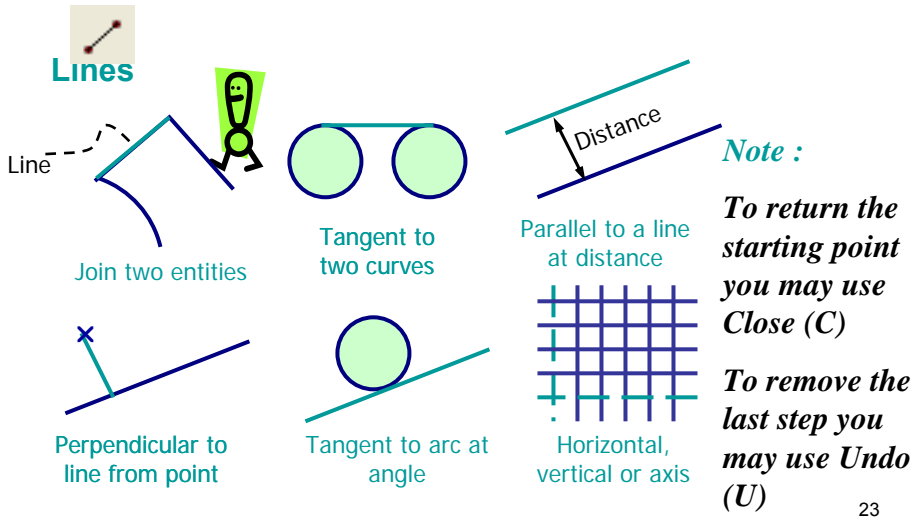


2. Parametric Design & Basic Drawing Functions



2. Parametric Design & Basic Drawing Functions

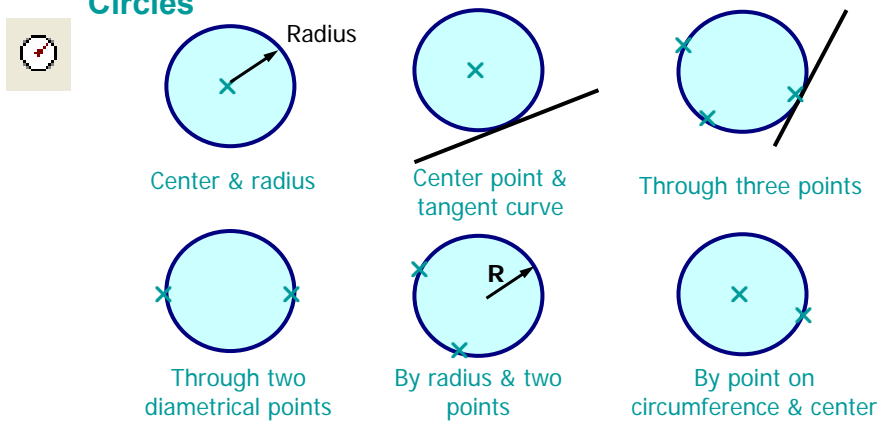
Lines



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2. Parametric Design & Basic Drawing Functions

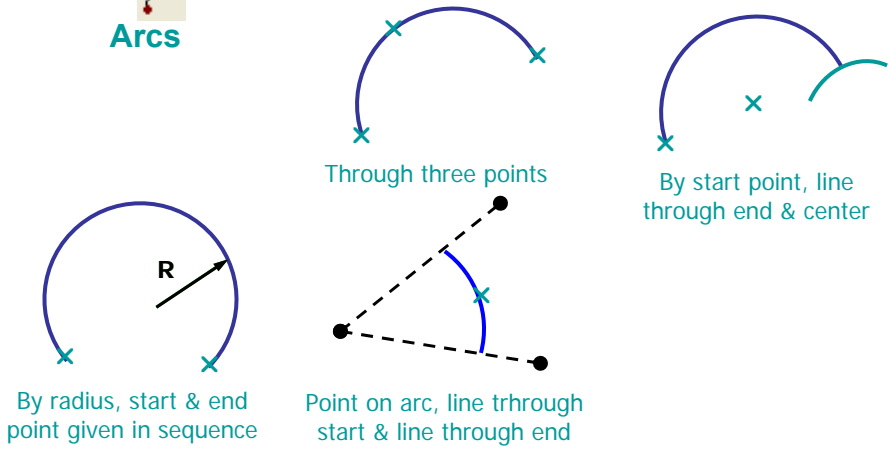
Circles



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2. Parametric Design & Basic Drawing Functions

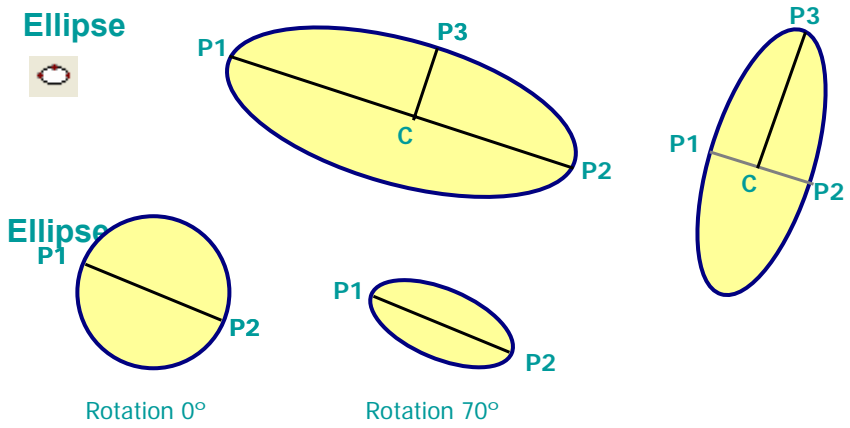
Arcs



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2. Parametric Design & Basic Drawing Functions

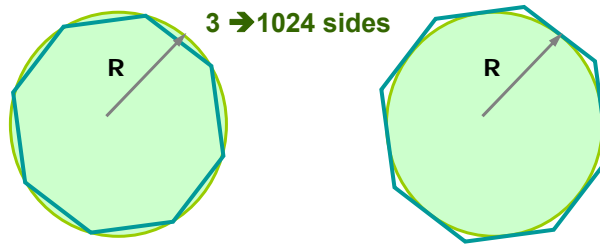
Ellipse



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2. Parametric Design & Basic Drawing Functions

Polygon



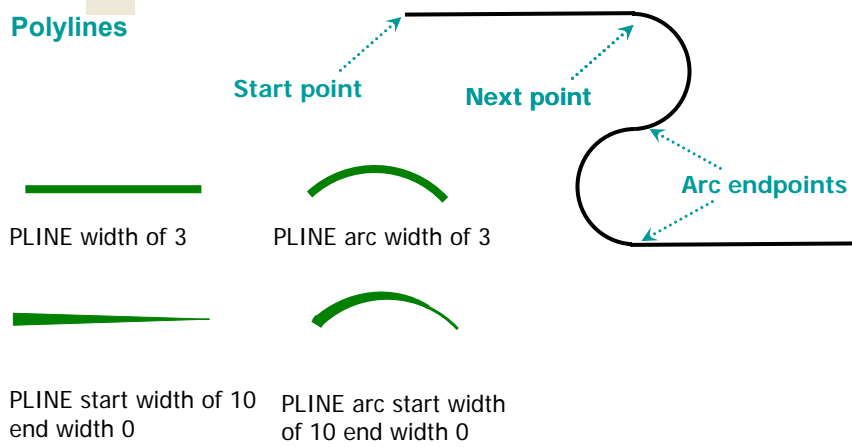
Inscribed

Circumscribed

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2. Parametric Design & Basic Drawing Functions

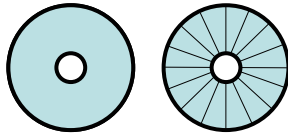
Polylines



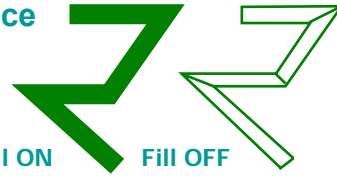
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2. Parametric Design & Basic Drawing Functions

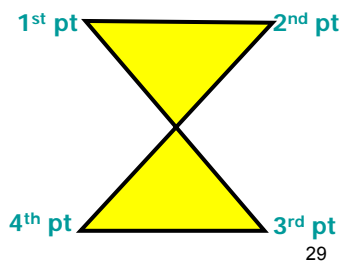
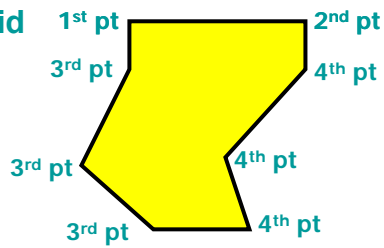
Donut



Trace



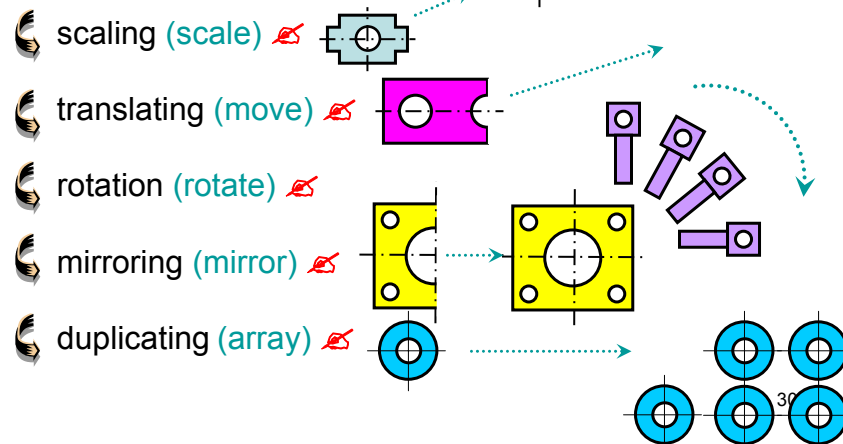
Solid



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2. Parametric Design & Basic Drawing Functions

Modification Commands



2. Parametric Design & Basic Drawing Functions

Automatic Functions

 fillet 

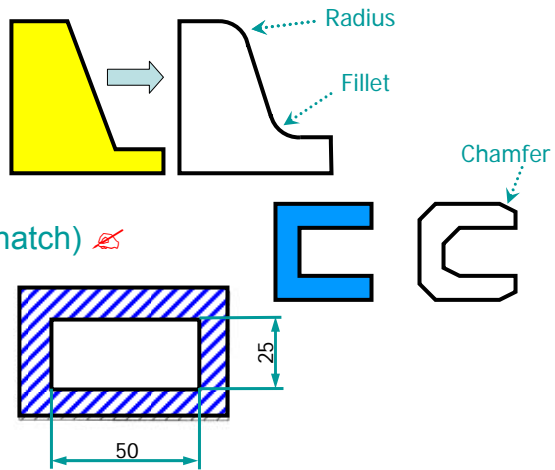
 chamfer 

 cross-hatching (hatch) 

 dimensioning 

 text 

Typing text




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2. Parametric Design & Basic Drawing Functions

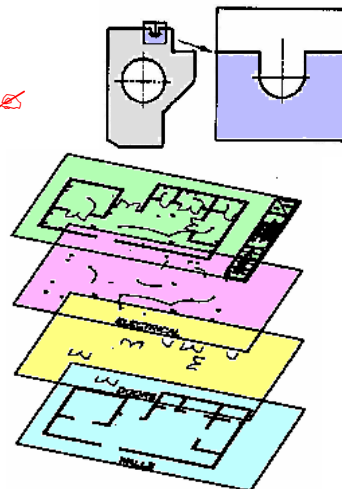
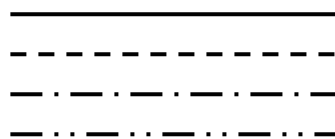
Management Functions

 display management (zoom) 

 entity attributes


 linetypes

 Layering

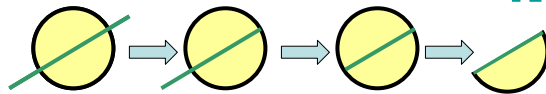
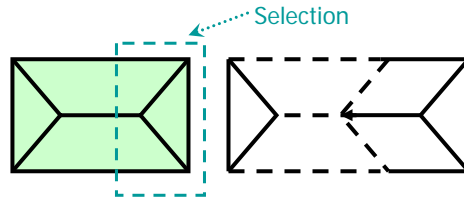


2. Parametric Design & Basic Drawing Functions

Editing Functions

 stretching (stretch) 

 Trim



 Extend



 Undelate (Undo) 

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2. Parametric Design & Basic Drawing Functions

Managing Commands

 Save



15-20 mins



 Quit



 End



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2. Parametric Design & Basic Drawing Functions

Drawing Accuracy



Function Keys

- Help**
- Text window**
- Coordinates On\Off**
- Grid On\Off**
- Ortho On\Off**
- Snap On\Off**



Control Keys

- Snap On\Off**
- Cancel**
- Isoplane left\top\right**
- Grid On\Off**
- Ortho On\Off**
- Print echo**
- Tablet On\Off**
- Delete keyboard errors**

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2. Parametric Design & Basic Drawing Functions

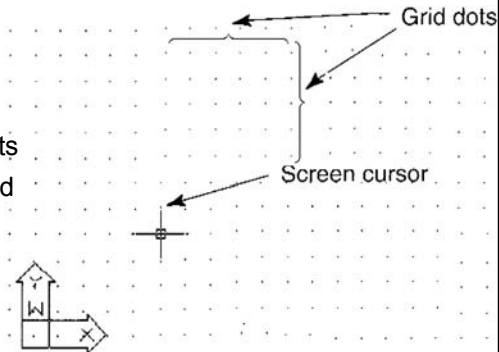
Grid \ Snap



The **SNAP** command restricts cursor crosshair movement to the snap increments






The **GRID** command sets the spacing between grid dots in both the **X** and **Y** axes

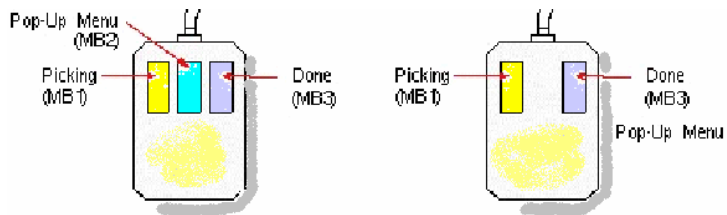


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2. Parametric Design & Basic Drawing Functions

Mouse Function

-  Left button : select
-  Middle button : pop-up menu
-  Right button : enter (pop-up menu & enter)

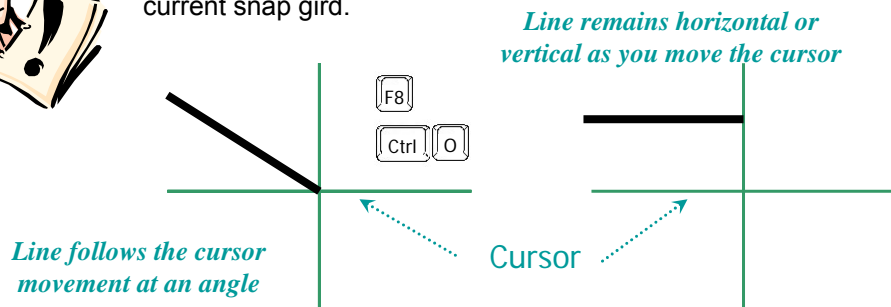


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2. Parametric Design & Basic Drawing Functions

Ortho Mode

Ortho, which stands for orthogonal, enables you to constrain lines to be drawn horizontally or vertically with respect to the current snap grid.



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2. Parametric Design & Basic Drawing Functions

Object Snap

Object snaps allow you to quickly pick exact locations on an object without having to be directly at the desired location.



AutoSnap gives us a visual symbol.

	Endpoint		Insert
	Midpoint		Perpendicular
	Center		Tangent
	Quadrant		Nearest
	Intersection		Node
	Apparent Intersect		

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2. Parametric Design & Basic Drawing Functions

Selecting Objects

When editing a drawing it is necessary first to select the objects which are to be edited.

Remove : to remove selected objects

Add : adding the objects

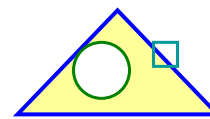
Undo : to cancel the selection

Window

Crossing

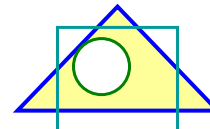


Pointing



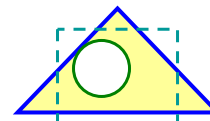
Selects a single line

Window



Selects the circle

Crossing



Selects all₄₀