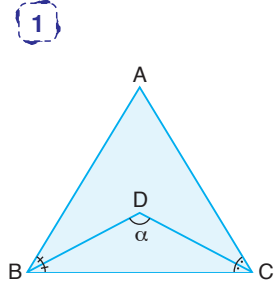
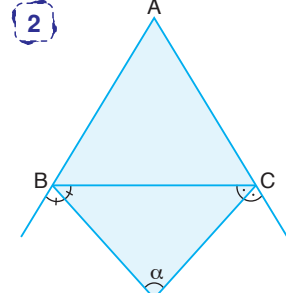
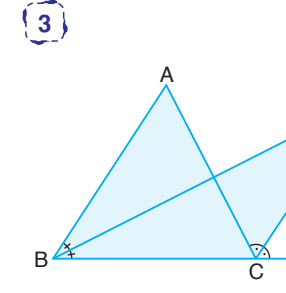
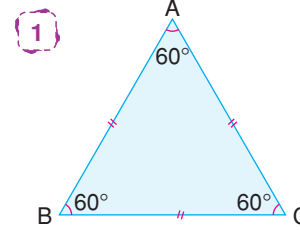
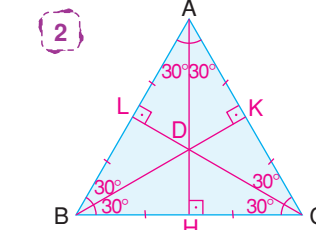


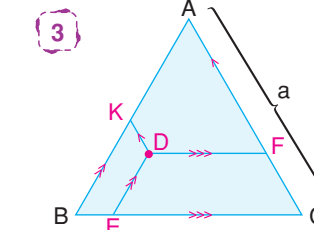
1  $\alpha = 90^\circ + \frac{m(\widehat{A})}{2}$
[AD] çizilirse açıortay olur.
D : İç teğet çemberin merkezi, iç açıortayların kesişme noktasıdır.

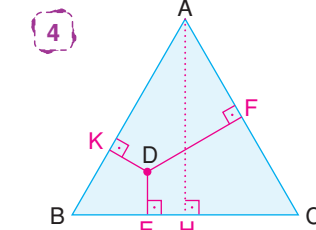
2  $\alpha = 90^\circ - \frac{m(\widehat{A})}{2}$
[AD] çizilirse açıortay olur.
D : Dış teğet çemberlerden birinin merkezidir.

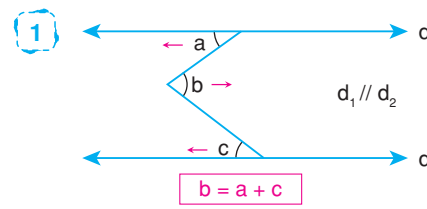
3  $\alpha = \frac{m(\widehat{A})}{2}$
[AD] çizilirse açıortay olur.

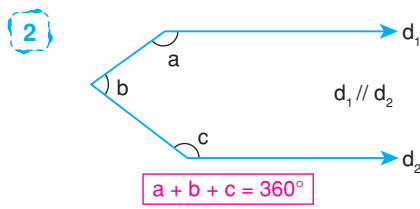
1  60° 60° 60°

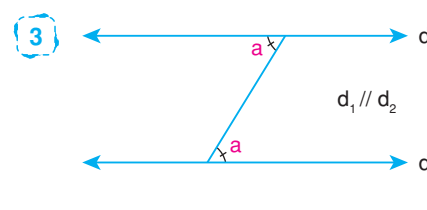
2  30° 30° 30° 30° 30° 30°
[AH] = [BK] = [CL]

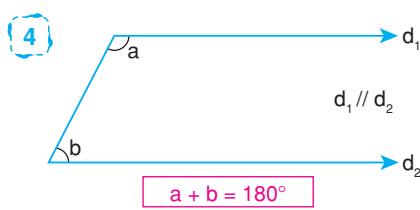
3  a
[DE] + [DF] + [DK] = a

4  a
[DE] + [DF] + [DK] = [AH]

1  $d_1 // d_2$
 $b = a + c$

2  $d_1 // d_2$
 $a + b + c = 360^\circ$

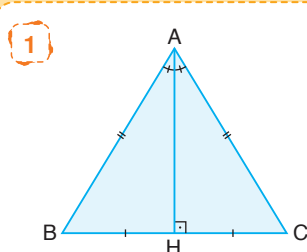
3  $d_1 // d_2$
 $a = b + c$

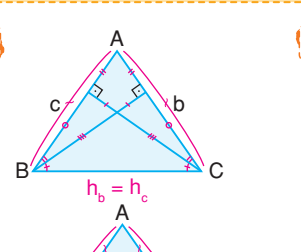
4  $d_1 // d_2$
 $a + b = 180^\circ$

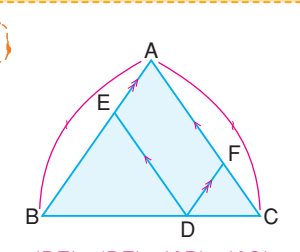
5 $x + y = 90^\circ$ ise x ve y tümler açıdır.

6 $x + y = 180^\circ$ ise x ve y bütünler açıdır.

7 $1^\circ = 60' = 3600'' \Rightarrow \frac{D}{180^\circ} = \frac{R}{\pi}$

1  i. Yükseklik $\rightarrow h_a$
ii. Açıortay $\rightarrow n_A$
iii. Kenarortay $\rightarrow V_a$
iv. İkizkenarlık $\rightarrow |AB| = |AC|$
Dört bilgidен ikisi varsa, diğer ikisi de vardır.

2  $h_b = h_c$
 $n_b = n_c$
 $V_b = V_c$

3  $|DE| + |DF| = |AB| = |AC|$
 $|DE| + |DF| = |BH| = |CK|$

ÜÇGENLER - 1

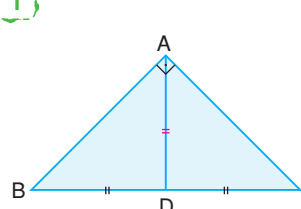
ÜÇGENDE AÇILAR

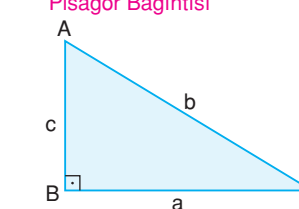
EŞKENAR ÜÇGEN

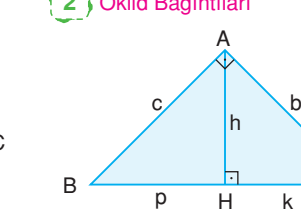
DOĞRUDA AÇILAR

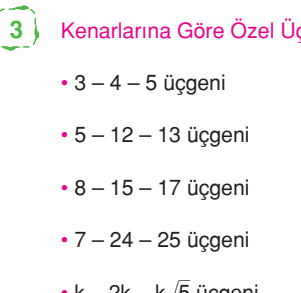
DİK ÜÇGEN VE TRİGONOMETRİ-İ

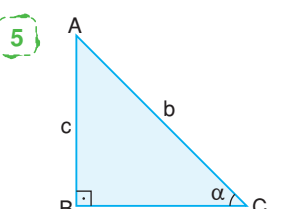
İKİZKENAR ÜÇGEN

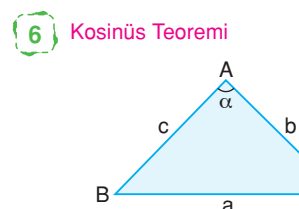
1  Muhteşem üçlü

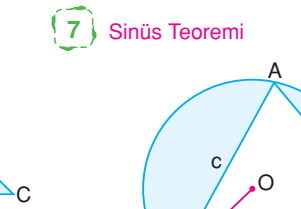
2  Pisagor Bağıntısı
 $b^2 = a^2 + c^2$

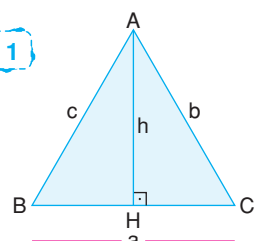
3  Öklid Bağıntıları
 $h^2 = p \cdot k$
 $b^2 = k \cdot a$
 $c^2 = p \cdot a$
 $a \cdot h = b \cdot c$

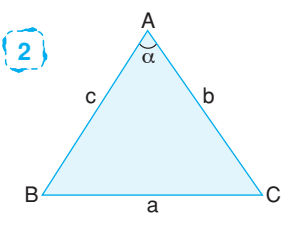
4  Kenarlarına Göre Özel Üçgenler
• 3 - 4 - 5 üçgeni
• 5 - 12 - 13 üçgeni
• 8 - 15 - 17 üçgeni
• 7 - 24 - 25 üçgeni
• k - 2k - k√5 üçgeni

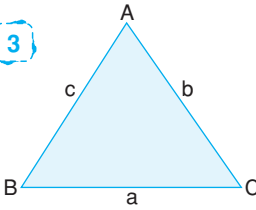
5  $\sin \alpha = \frac{c}{b}$
 $\cos \alpha = \frac{a}{b}$
 $\tan \alpha = \frac{c}{a}$
 $\cot \alpha = \frac{a}{c}$

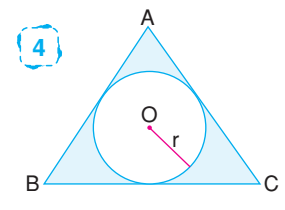
6  Kosinüs Teoremi
 $a^2 = b^2 + c^2 - 2 \cdot b \cdot c \cdot \cos \alpha$

7  Sinüs Teoremi
 $\frac{a}{\sin \widehat{A}} = \frac{b}{\sin \widehat{B}} = \frac{c}{\sin \widehat{C}} = 2r$

1  $A(\widehat{ABC}) = \frac{a \cdot h}{2}$

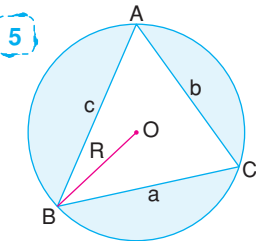
2  $A(\widehat{ABC}) = \frac{1}{2} \cdot b \cdot c \cdot \sin \alpha$

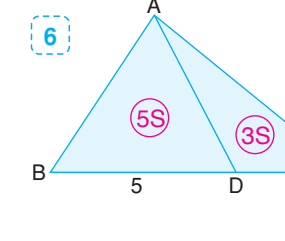
3 

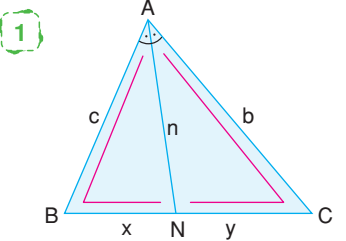
4  $A(\widehat{ABC}) = u \cdot r$

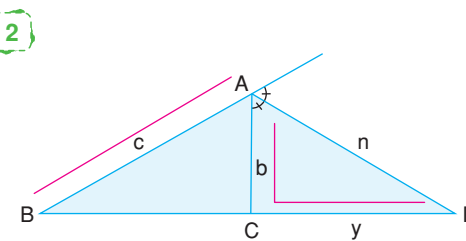
(u : üçgenin çevresinin yarısı)

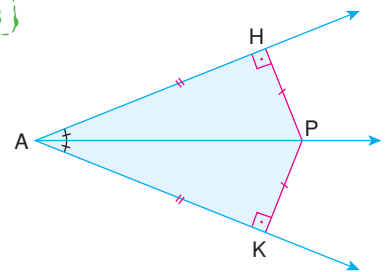
$A(\widehat{ABC}) = \sqrt{u \cdot (u-a) \cdot (u-b) \cdot (u-c)}$

5  $A(\widehat{ABC}) = \frac{a \cdot b \cdot c}{4R}$

6 

1  $\frac{c}{x} = \frac{b}{y}$
 $n^2 = b \cdot c - x \cdot y$

2  $\frac{c}{x} = \frac{b}{y}$
 $n^2 = x \cdot y - b \cdot c$

3 

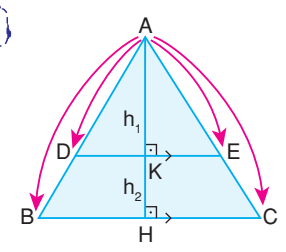
ÜÇGENDE
ALAN

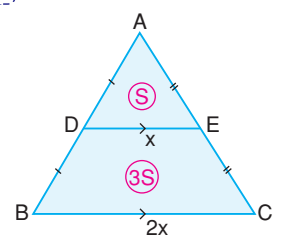
AÇIORTAY

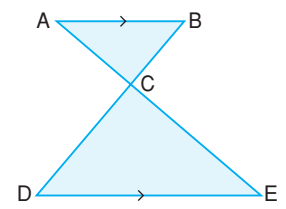
ÜÇGENDE
BENZERLİK

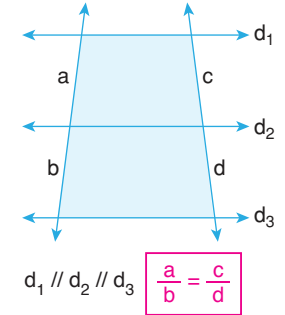
ÜÇGENLER-2

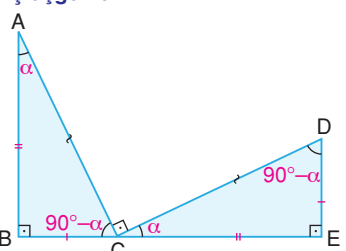
KENARORTAY

1  $\widehat{ADE} \sim \widehat{ABC}$
 $k = \frac{|ADI|}{|ABI|} = \frac{|AEI|}{|ACI|} = \frac{|DEI|}{|BCI|} = \frac{h_1}{h_1 + h_2}$
 $k^2 = \frac{A(\widehat{ADE})}{A(\widehat{ABC})}$

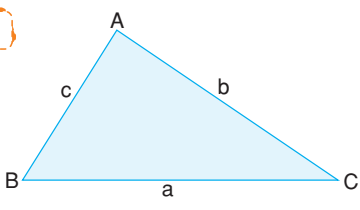
2 Temel Benzerlik  $\widehat{ABC} \sim \widehat{CED}$

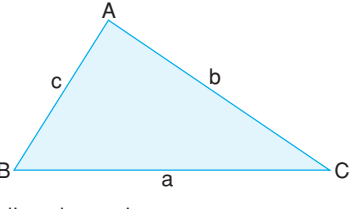
3 Kelebek Benzerliği  $\widehat{ABC} \sim \widehat{EDC}$

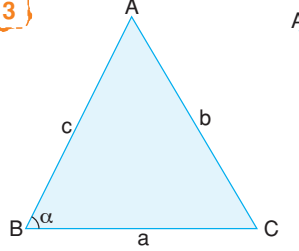
4 Thales Teoremi  $d_1 \parallel d_2 \parallel d_3$
 $\frac{a}{b} = \frac{c}{d}$

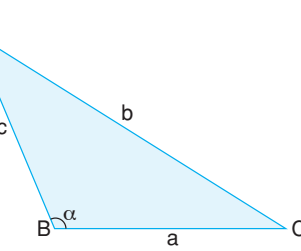
5 Eş üçgenler  $k = 1$ ise üçgenler eştir.
 $\widehat{ABC} \cong \widehat{CED}$

ÜÇGENDE AÇI-KENAR BAĞINTILARI

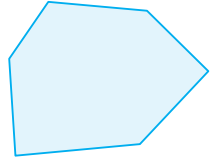
1  $m(\widehat{A}) > m(\widehat{B}) > m(\widehat{C})$ ise
 $a > b > c$ $h_a < h_b < h_c$
 $V_a < V_b < V_c$

2 Üçgen Eşitsizliği  $|b - c| < a < b + c$
 $|a - c| < b < a + c$
 $|a - b| < c < a + b$

3  $\alpha < 90^\circ$
 $b^2 < a^2 + c^2$

 $\alpha > 90^\circ$
 $b^2 > a^2 + c^2$

n kenarlı bir çokgenin,



- Bir köşesinden $n - 3$ tane köşegen çizilir.
- Bir köşesinden çizilen köşegenler $n - 2$ tane üçgen oluşturur.
- Köşegen sayısı $\frac{n(n-3)}{2}$ dir.
- İç açı toplamı $(n - 2) \cdot 180^\circ$ dir.
- Dış açı toplamı 360° dir.

KONVEKS ÇOKGEN

DÜZGÜN ÇOKGEN

ÇOKGENLER

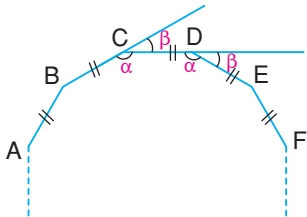
ÇOKGENLER VE DÖRTGENLER - I

DÖRTGENLER

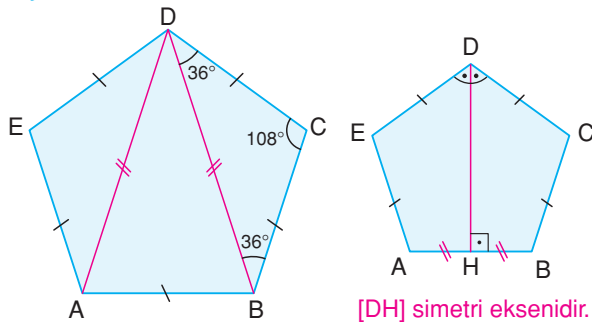
DELTOİD

1 n kenarlı bir düzgün çokgenin,

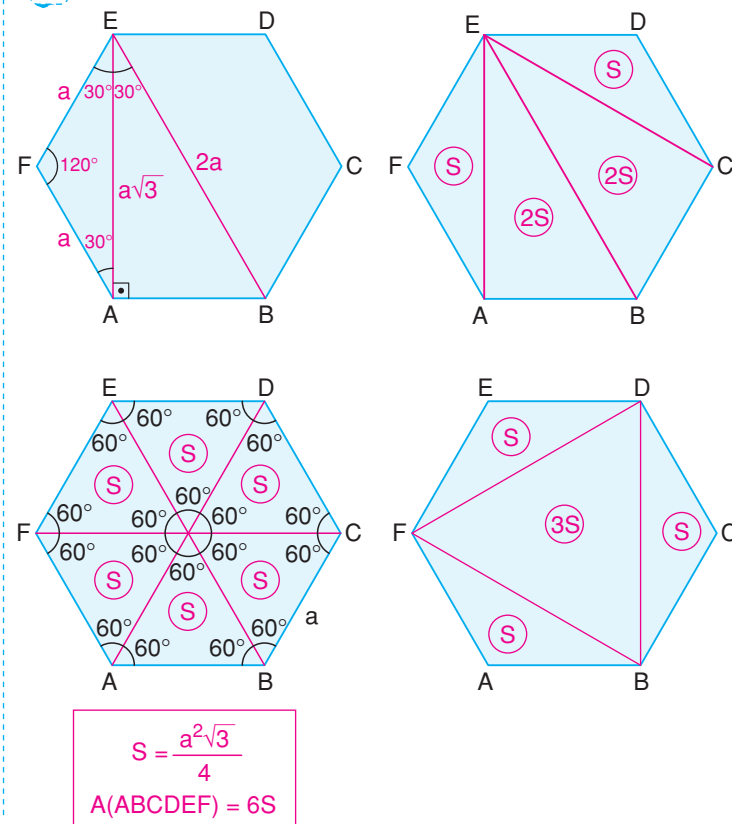
- Bir dış açısının ölçüsü $\beta = \frac{360^\circ}{n}$
- Bir iç açısının ölçüsü $\alpha = \frac{(n-2) \cdot 180^\circ}{n}$
- $\alpha + \beta = 180^\circ$



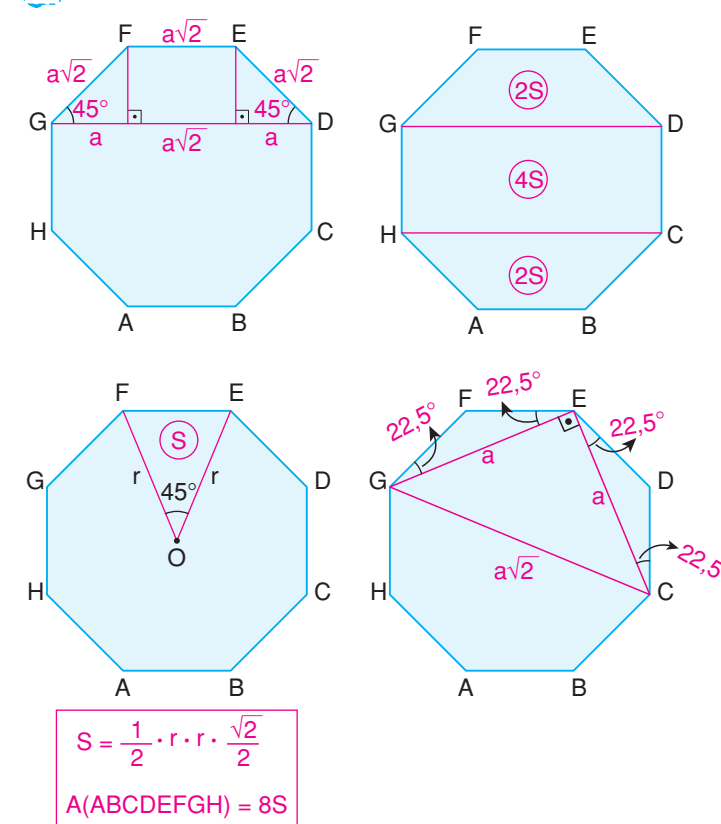
2 Düzgün Beşgen



3 Düzgün Altıgen



4 Düzgün Sekizgen



1 Köşegenler birbirini ortalar

2 $A(\widehat{APB}) = \frac{A(ABCD)}{2}$

3 $S_1 + S_3 = S_2 + S_4 = \frac{A(ABCD)}{2}$

4 $A(\widehat{ADE}) = \frac{A(ABCD)}{2}$

5 İkizkenar yamukta köşegenler eşittir.

6 $A(ABCD) = \left(\frac{a+c}{2}\right) \cdot h$

7 $h^2 = a \cdot c$

8 $|DF| + |BH| = |AE| + |CK|$
 $[AE] \parallel [DF] \parallel [BH] \parallel [CK]$

9 $A(ABCD) = a \cdot ha = b \cdot hb$
 $A(ABCD) = a \cdot b \cdot \sin \alpha$

Dört kenarı birbirine eşit paralelkenardır.

ALAN

$A(ABCD) = a \cdot h$

- Köşegenler dik kesişir.
- Köşegenler açıortaydır.

Bütün açıları 90° olan paralelkenardır.

1 Köşegenler eşittir.
 $A(ABCD) = a \cdot b$

2 $x^2 + z^2 = y^2 + t^2$

Bütün kenarları eşit olan dikdörtgendir.

- Köşegenler dik kesişir.
- Köşegenler açıortaydır.

$A(ABCD) = a^2$

1 $|EF| = \frac{a+c}{2}$

2 $A(\widehat{ADE}) = \frac{A(ABCD)}{2}$

3 İkizkenar yamukta köşegenler eşittir.

4 $A(ABCD) = \left(\frac{a+c}{2}\right) \cdot h$

5 $h^2 = a \cdot c$

6 $A(ABCD) = \left(\frac{a+c}{2}\right) \cdot h$

7 $h^2 = a \cdot c$

ÇOKGENLER VE DÖRTGENLER 2

PARALELKENAR

EŞKENAR DÖRTGEN

DİKDÖRTGEN

YAMUK

KARE

1 Merkez Aç

2 Çevre Aç

3 Teğet - Kiriş Aç

4 İç Aç

$$\alpha = \frac{x+y}{2}$$

5 Dış Aç

$$\alpha = \frac{x-y}{2}$$

6

$$\alpha + \beta = 180^\circ$$

7

8

Çapı gören çevre aç 90° dir.

9 ABCD Kirişler Dörtgeni

$$x + y = 180^\circ$$

$$\alpha + \beta = 180^\circ$$

1

2

3

4

5 ABCD Teğetler Dörtgeni

$$|AB| + |CD| = |AD| + |BC|$$

6 Dıştan Teğet Çemberler

$$|O_1O_2| = r_1 + r_2$$

7 İçten Teğet Çemberler

$$|O_1O_2| = r_1 - r_2$$

8 Çemberler Dik Kesişirse

$$|O_1O_2|^2 = r_1^2 + r_2^2$$
ÇEMBERDE
AÇI

ÇEMBER VE DAİRE

ÇEMBERDE UZUNLUK

DAİREDE UZUNLUK VE ALAN

1

$$\text{Çevre} = 2\pi r$$

$$\text{Alan} = \pi r^2$$

2

$$|AB| = 2\pi r \cdot \frac{\alpha}{360^\circ}$$

$$\text{Dilim Alanı} = \pi r^2 \cdot \frac{\alpha}{360^\circ}$$

3

$$\text{Dilim Alanı} = \frac{l \cdot r}{2}$$

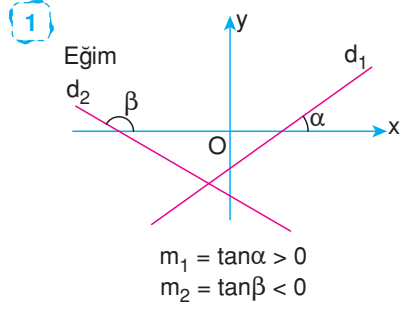
4

5

6

ANALİTİK GEOMETRİ-1

DOĞRU ANALİTİĞİ - 2

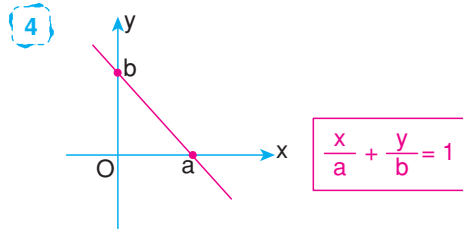


2 İki noktası bilinen doğrunun eğimi;
A(x₁, y₁) ve B(x₂, y₂) noktaları için

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

3 Eğim ve bir noktası bilinen doğru denklemleri
(Kartezyen veya Kapalı Denklemler)
Eğim m ve nokta A(x₁, y₁) için

d: $m = \frac{y - y_1}{x - x_1}$ şeklinde yazılır.



5 x eksenini y = 0 doğrusudur.
y eksenini x = 0 doğrusudur.

6 Parametrik ve vektörel denklemler

$\vec{u} = (a, b)$ \vec{u} doğrultman vektör

A(x₁, y₁) d $\vec{u} \parallel d$

$x = x_1 + k \cdot a$
 $y = y_1 + k \cdot b$ Parametrik denklem

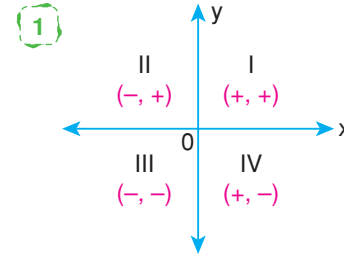
$(x, y) = (x_1, y_1) + k \cdot (a, b)$ Vektörel denklem

7 • Paralel doğruların eğimleri eşittir.

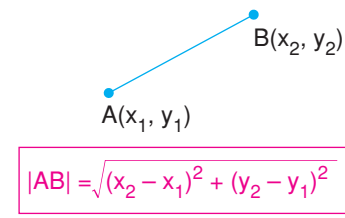
$$d_1 \parallel d_2 \Leftrightarrow m_1 = m_2$$

• Dik doğruların eğimleri çarpımı -1'dir.

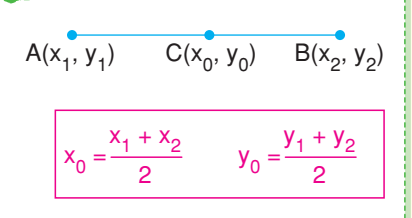
$$d_1 \perp d_2 \Leftrightarrow m_1 \cdot m_2 = -1$$



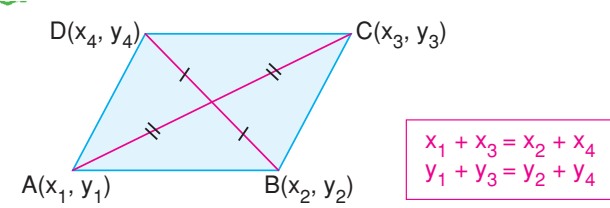
2 İki nokta arasındaki uzaklık



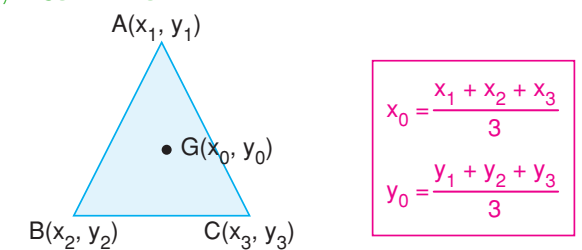
3 Orta Nokta



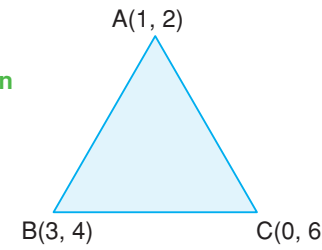
4 Paralelkenarın Köşe Koordinatları



5 Üçgenin Ağırlık Merkezinin Koordinatları



6 Üç köşesi bilinen üçgen alanı



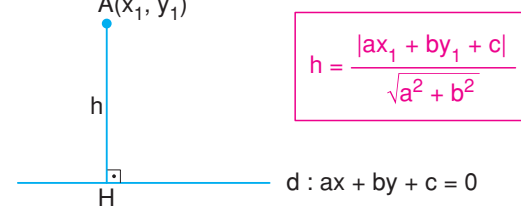
$$A(\widehat{ABC}) = \frac{1}{2} \begin{vmatrix} 1 & 2 \\ 3 & 4 \\ 0 & 6 \end{vmatrix}$$

$$L = 6 + 0 + 6, \quad K = 4 + 18 + 0$$

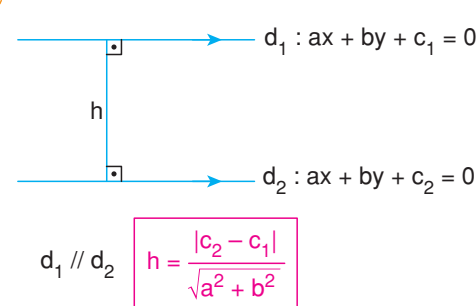
$$A(\widehat{ABC}) = \frac{1}{2} |K - L|$$

$$A(\widehat{ABC}) = \frac{1}{2} |22 - 12| = 5 \text{ br}^2$$

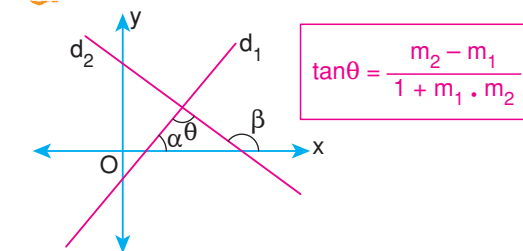
1 Noktanın doğruya uzaklığı



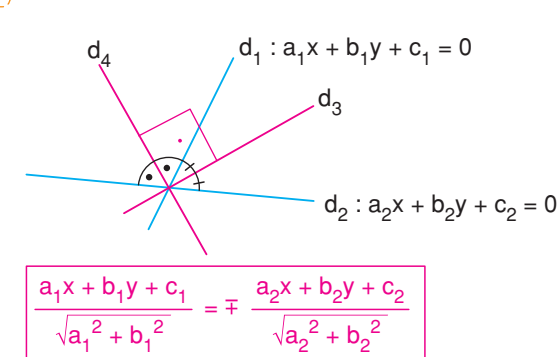
2 İki doğru arasındaki uzaklık



3 İki doğru arasındaki uzaklık

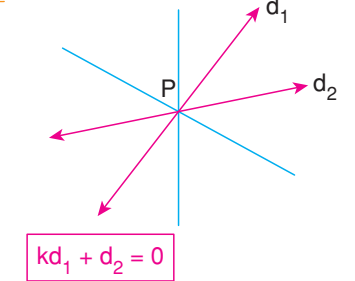


4 Açılırtay doğru denklemleri

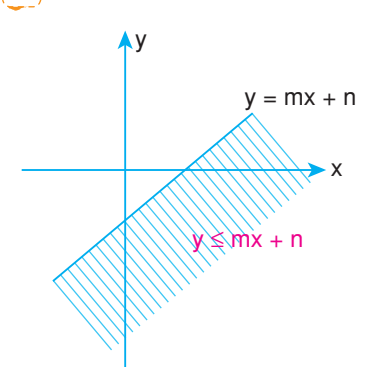


⇒ denklemden d₃ ve d₄ açılırtay doğru denklemlerine ulaşılır. d₃ ⊥ d₄

5 Doğru demeti



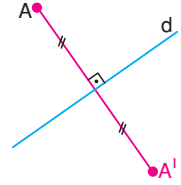
6 Eşitsizlik Grafiği



1 Noktanın noktaya göre simetriği



2 Noktanın doğruya göre simetriği

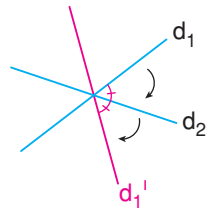


$A(x_1, y_1)$	Ox eksenine göre	$A'(x_1, -y_1)$
	Oy eksenine göre	$A'(-x_1, y_1)$
	Orijin	$A'(-x_1, -y_1)$
	$y = x$	$A'(y_1, x_1)$
	$y = -x$	$A'(-y_1, -x_1)$
	$x = a$	$A'(2a - x_1, y_1)$
	$y = b$	$A'(x_1, 2b - y_1)$

3 Doğrunun noktaya göre simetriği

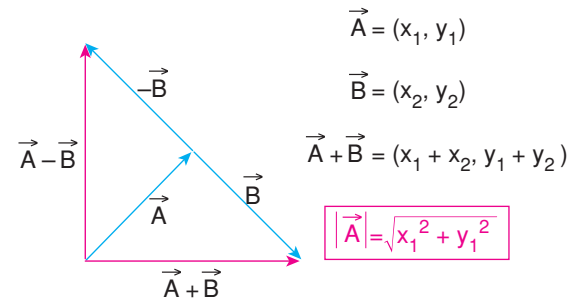


4 Doğrunun doğruya göre simetriği



$ax + by + c = 0$	Ox eksenine	$ax - by + c = 0$
	Oy eksenine	$-ax + by + c = 0$
	Orijin	$-ax - by + c = 0$
	$y = x$	$ay + bx + c = 0$
	$y = -x$	$-ay - bx + c = 0$
	$x = d$	$a(2d - x) + by + c = 0$
	$y = e$	$ax + b(2e - y) + c = 0$

1



4 Skaler Çarpım (Öklid İç Çarpımı)

$$\vec{A} = (x_1, y_1), \vec{B} = (x_2, y_2)$$

$$\vec{A} \cdot \vec{B} = x_1 \cdot x_2 + y_1 \cdot y_2$$

2

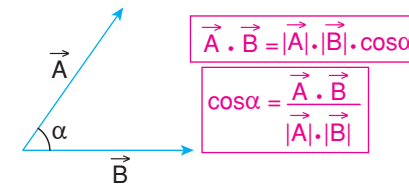
$$\vec{A} = (x_1, y_1), \vec{B} = (x_2, y_2)$$

$$\vec{AB} = \vec{B} - \vec{A} = (x_2 - x_1, y_2 - y_1)$$

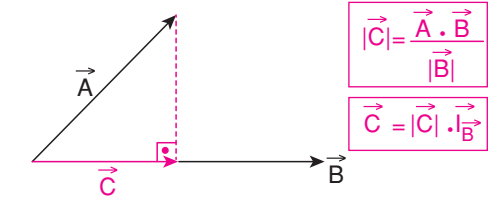
Eşit vektörler
 $\vec{A} = \vec{B} \Leftrightarrow x_1 = x_2, y_1 = y_2$

Vektörün bir reel sayı ile çarpımı
 $\hat{A} = (x_1, y_1) \quad k \in \mathbb{R} \quad k\vec{A} = (kx_1, ky_1)$

5 İç Çarpımın Geometrik Yorumu



6 Dik İzdüşüm Uzunluğu ve Vektörü

SİMETRİ
(YANSIMA)

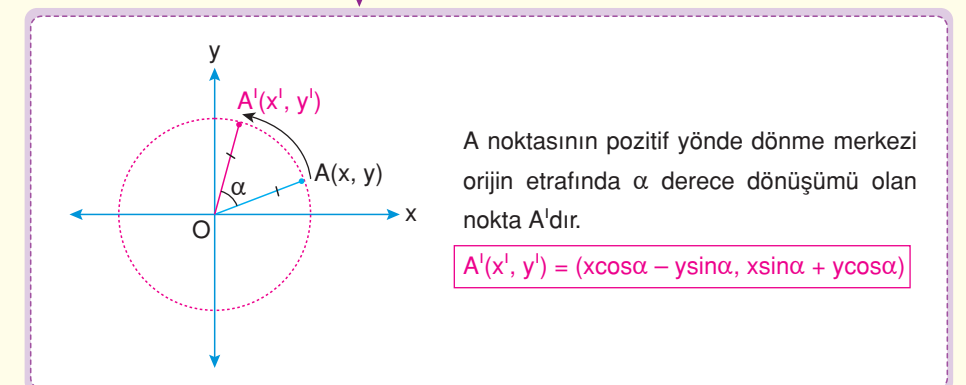
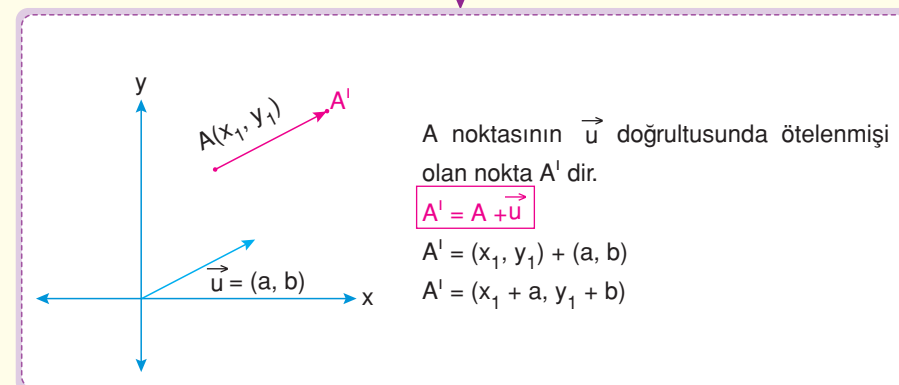
DÖNÜŞÜMLER

ANALİTİK
GEOMETRİ - 2

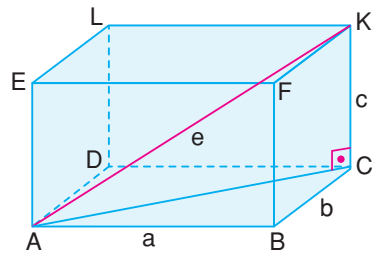
VEKTÖRLER

ÖTELEME

DÖNDÜRME



1 Dikdörtgenler Prizması



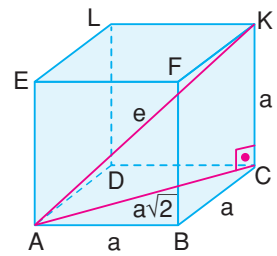
Yanal Alan = $2(ac + bc)$

Alan = $2(ab + ac + bc)$

Hacim = $a \cdot b \cdot c$

$e = \sqrt{a^2 + b^2 + c^2}$

2 Küp



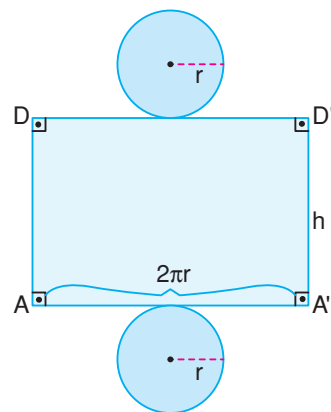
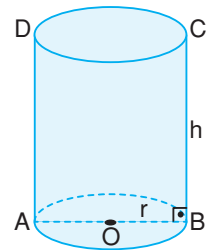
Yanal Alan = $4a^2$

Alan = $6a^2$

Hacim = a^3

$e = a\sqrt{3}$

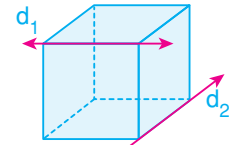
3 Dik Silindir



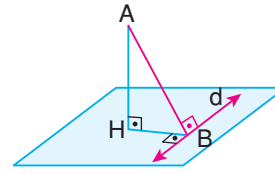
Yanal Alan = $2\pi r \cdot h$

Alan = $2\pi rh + 2\pi r^2$

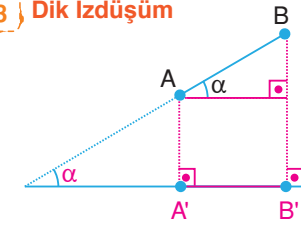
Hacim = $\pi r^2 \cdot h$

1 \mathbb{R}^3 'de aykırı doğrular paralel değildir, kesişmez.• d_1 ve d_2 aykırı doğrulardır.

2 Üç Dikme Teoremi



3 Dik İzdüşüm



$|A'B'| = |AB| \cdot \cos\alpha$

UZAY GEOMETRİ

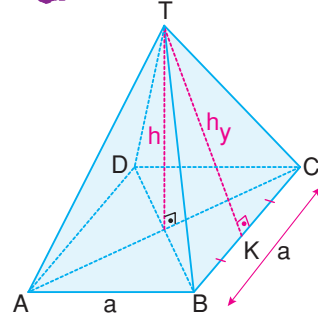
UZAY GEOMETRİ VE KATI CİSİMLER

PRİZMA

KÜRE VE DÖNEL CİSİMLER

PİRAMİT

1 Düzgün Kare Dik Piramit

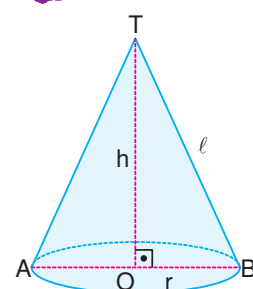


Yanal Alan = $4 \cdot \frac{a \cdot h_y}{2}$

Alan = $4 \cdot \frac{a \cdot h_y}{2} + a^2$

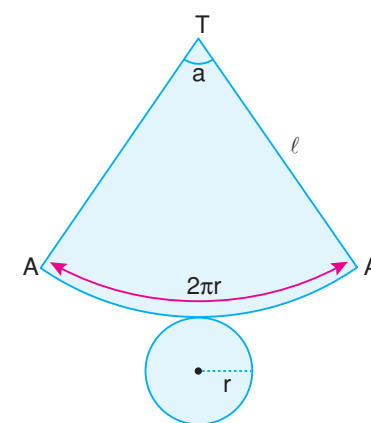
Hacim = $\frac{1}{3} a^2 \cdot h$

2 Dik Koni



Yanal Alan = $\pi r l$

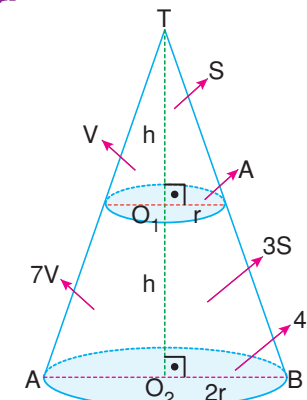
Alan = $\pi r l + \pi r^2$



Hacim = $\frac{1}{3} \pi r^2 \cdot h$

$\frac{r}{l} = \frac{\alpha}{360^\circ}$

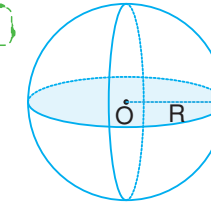
3 Kesik Piramit



$$k = \frac{1}{2}, \quad k^2 = \frac{1}{4}, \quad k^3 = \frac{1}{8}$$

uzunluk oranı $\frac{r}{2r}$ alan oranı $\frac{A}{4A}$ hacim oranı $\frac{V}{7V}$

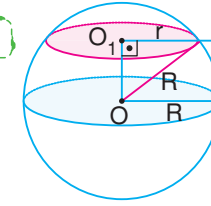
1



Alan = $4\pi R^2$

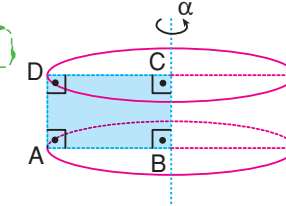
Hacim = $\frac{4}{3} \pi R^3$

2

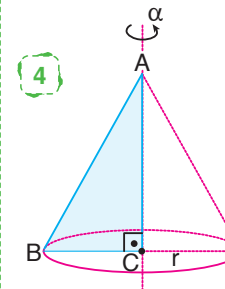


Küre düzlemde kesilirse oluşan kesit dairedir.

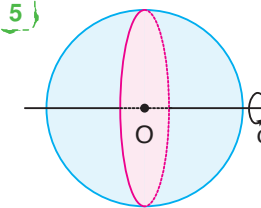
3

Dikdörtgen, kenarlarından biri etrafında $\alpha = 360^\circ$ döndürülürse **dik silindir** oluşur.

4

Dik üçgen, dik kenarlarından biri etrafında $\alpha = 360^\circ$ döndürülürse **dik koni** oluşur.

5

Daire, çap eksenini etrafında $\alpha = 180^\circ$ döndürülürse **küre** oluşur.