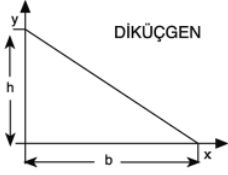
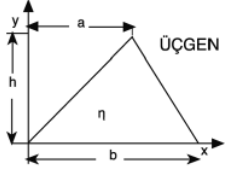
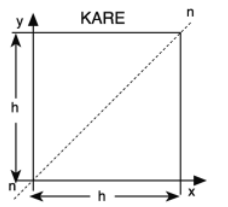
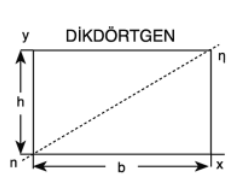
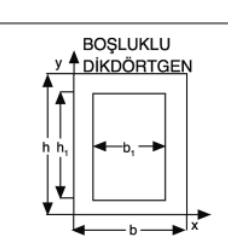
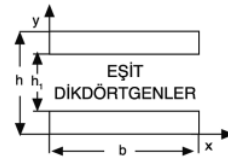
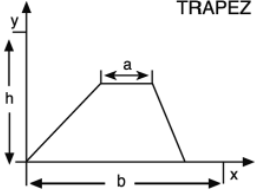
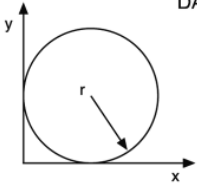
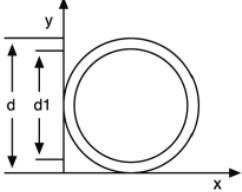
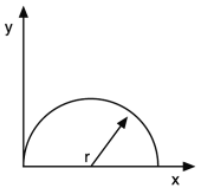


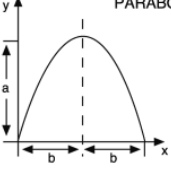
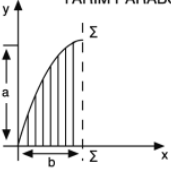
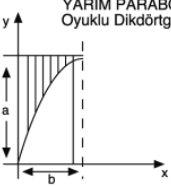
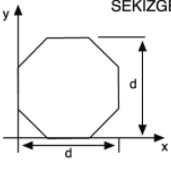
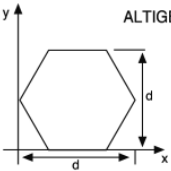
## Düzlemsel Geometrik Şekillerin Özellikleri

Geometrik Şekil	Alan - Geometrik Merkez	Eylemsizlik Momenti	Dayanım Momenti
 <p style="text-align: center;">DİKÜÇGEN</p>	$A = \frac{bh}{2}$ $X_c = \frac{b}{3}$ $Y_c = \frac{h}{3}$	$I_{xc} = bh^3 / 36$ $I_{yc} = hb^3 / 36$ $I_x = bh^3 / 12$ $I_y = hb^3 / 12$	$W_{xc} = \frac{bh^2}{24}$ $W_{yc} = \frac{hb^2}{24}$
 <p style="text-align: center;">ÜÇGEN</p>	$A = \frac{bh}{2}$ $X_c = \frac{a+b}{3}$ $Y_c = \frac{h}{3}$	$I_{xc} = bh^3 / 36$ $I_{yc} = \frac{bh}{36} (b^2 - ab + a^2)$ $I_x = bh^3 / 12 +$ $I_y = \frac{bh}{12} (b^2 - ab + a^2)$	$W_{xc} = \frac{bh^2}{24}$
 <p style="text-align: center;">KARE</p>	$A = h^2$ $X_c = \frac{h}{2}$ $Y_c = \frac{h}{2}$	$I_{xc} = I_{yc} = h^4 / 12$ $I_x = I_y = h^4 / 3$ $I_{\eta} = h^4 / 12$	$W_{xc} = W_{yc} = \frac{h^3}{6}$
 <p style="text-align: center;">DİKDÖRTGEN</p>	$A = b \cdot h$ $X_c = \frac{b}{2}$ $Y_c = \frac{h}{2}$	$I_{xc} = bh^3 / 12$ $I_{yc} = hb^3 / 12$ $I_x = bh^3 / 3$ $I_y = hb^3 / 3$ $I_{\eta} = \frac{b^3 - h^3}{6 (b^2 + h^2)}$	$W_{xc} = \frac{bh^2}{6}$ $W_{yc} = \frac{hb^2}{6}$
 <p style="text-align: center;">BOŞLUKLU DİKDÖRTGEN</p>	$A = bh - b_1 h_1$ $X_c = \frac{b}{2}$ $Y_c = \frac{h}{2}$	$I_{xc} = \frac{(bh^3 - b_1 h_1^3)}{12}$ $I_{yc} = \frac{(hb^3 - h_1 b_1^3)}{12}$	$W_{xc} = \frac{1}{6} \left( \frac{bh^3 - b_1 h_1^3}{h} \right)$ $W_{yc} = \frac{1}{6} \left( \frac{hb^3 - h_1 b_1^3}{b} \right)$
 <p style="text-align: center;">EŞİT DİKDÖRTGENLER</p>	$A = b(h-h_1)$ $X_c = \frac{b}{2}$ $Y_c = \frac{h}{2}$	$I_{xc} = \frac{b(h^3 - h_1^3)}{12}$ $I_{yc} = \frac{b^3(h - h_1)}{12}$	$W_{xc} = \frac{b(h^3 - h_1^3)}{6h}$ $W_{yc} = \frac{b^2(h - h_1)}{6}$

## Düzlemsel Geometrik Şekillerin Özellikleri

Geometrik Şekil	Alan - Geometrik Merkez	Eylemsizlik Momenti	Dayanım Momenti
<p>TRAPEZ</p> 	$A = \frac{h}{2} (a+b)$ $y_c = \frac{h}{3} \frac{(2a+b)}{a+b}$	$I_{xc} = \frac{h^3 (a^2+4ab+b^2)}{36 (a+b)}$ $I_x = \frac{h^3 (3a+b)}{12}$	$W_{xc} = \frac{I_{xc}}{h-y_c}$
<p>DAİRE</p> 	$A = \pi r^2$ $X_c = r$ $Y_c = r$	$I_{xc} = I_{yc} = \frac{\pi r^4}{4}$ $I_x = I_y = \frac{5 \pi r^4}{4}$	$W_{xc} = W_{yc} = \frac{\pi r^3}{4}$
<p>BOŞLUKLU DAİRE</p> 	$A = \frac{\pi (d^2 - d_1^2)}{4}$ $X_c = \frac{d}{2}$ $Y_c = \frac{d}{2}$	$I_{xc} = I_{yc} = \frac{\pi (d^4 - d_1^4)}{64}$	$W_{xc} = W_{yc} = \frac{\pi (d^4 - d_1^4)}{32d}$
<p>YARIM DAİRE</p> 	$A = \frac{\pi r^2}{2}$ $X_c = r$ $Y_c = \frac{4r}{3\pi}$	$I_{xc} = \frac{r^4 (9\pi^2 - 64)}{72\pi}$ $I_{yc} = \frac{\pi r^4}{8}$ $I_x = \frac{\pi r^4}{8}$ $I_y = \frac{5\pi r^4}{8}$	$W_{xc} = \frac{I_{xc}}{(r-y_c)}$ $W_{yc} = \frac{\pi r^3}{8}$

## Düzlemsel Geometrik Şekillerin Özellikleri

Geometrik Şekil	Alan - Geometrik Merkez	Eylemsizlik Momenti	Dayanım Momenti
 <p style="text-align: center;">PARABOL</p>	$A = \frac{4}{3} ab$ $X_c = b$ $Y_c = \frac{2}{5} a$	$I_{xc} = \frac{16}{175} a^3 b$ $I_{yc} = \frac{4}{15} ab^3$ $I_x = \frac{32}{105} a^3 b$	$W_{xc} = \frac{16}{105} a^2 b$ $W_{yc} = \frac{4}{15} ab^2$
 <p style="text-align: center;">YARIM PARABOL</p>	$A = \frac{2}{3} ab$ $X_c = \frac{5}{8} b$ $Y_c = \frac{2}{5} a$	$I_{xc} = \frac{8}{175} a^3 b$ $I_{yc} = \frac{19}{480} ab^3$ $I_x = \frac{16}{105} a^3 b$ $= \frac{2}{15} ab^3$	$W_{xc} = \frac{8}{105} a^2 b$ $W_{yc} = \frac{19}{300} ab^2$
 <p style="text-align: center;">YARIM PARABOL Oyuklu Dikdörtgen</p>	$A = \frac{1}{3} ab$ $X_c = \frac{1}{4} b$ $Y_c = \frac{7}{10} a$	$I_{xc} = \frac{37}{2100} a^3 b$ $I_{yc} = \frac{1}{80} ab^3$	$W_{xc} = \frac{37}{1470} a^2 b$ $W_{yc} = \frac{1}{60} ab^2$
 <p style="text-align: center;">SEKİZGEN</p>	$A = 0.8284 d^2$ $X_c = Y_c = \frac{d}{2}$	$I_{xc} = I_{yc} = 0.055 d^4$	$W_{xc} = W_{yc} = 0.110 d^3$
 <p style="text-align: center;">ALTIGEN</p>	$A = 0.866 d^2$ $X_c = Y_c = \frac{d}{2}$	$I_{xc} = I_{yc} = 0.06 d^4$	$W_{xc} = W_{yc} = 0.120 d^3$

A = geometrik şeklin alanı

$X_c, Y_c$  = alan geometrik merkezinin x ve y koordinatları

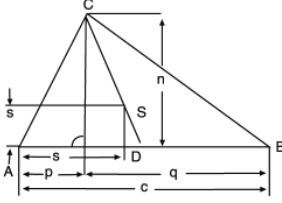
$I_{xc}, I_{yc}$  = alanın geometrik merkezden geçen ve x, y koordinat eksenlerine paralel olan eksenler etrafındaki eylemsizlik momentleri

$I_x, I_y$  = alanın x, y koordinat eksenleri etrafındaki eylemsizlik momentleri

$W_{xc}, W_{yc}$  = alanın geometrik merkezden geçen ve x, y koordinat eksenlerine paralel olan eksenler etrafındaki dayanım momentleri

# Ağırlık Merkezleri

## ÜÇGEN

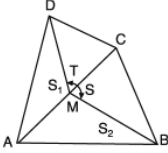


$$SD = 1/3 CD; AD = BD$$

$$S = 1/3 h$$

$$S' = 1/3 (q + 2p) = 1/3 (c + p)$$

## DÖRTGEN

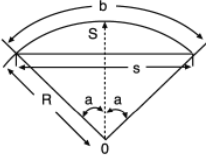


$S_1$  ve  $S_2$  sıra ile  $\Delta ABC$  ve  $\Delta ADC$  ağırlık merkezleri;

$$S_1 T = S_2 T$$

S Dörtgenin ağırlık merkezidir.

## DAİRE YAYI



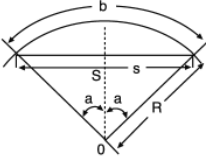
$$OS = \frac{R \sin a}{a^2} \times \frac{180}{\pi} - \frac{Rs}{b}$$

Yarım Daire  $OS = 2R / \pi = 0.6366 R$

Dörttebir Daire  $OS = 2R / \sqrt{\pi} = 0.9003 R$

Altıdabir Daire  $OS = 3R / \pi = 0.9549 R$

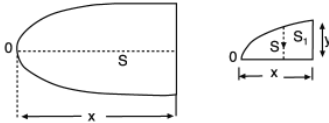
## DAİRE PARÇASI



$$F = \text{Alan}$$

$$OS = \frac{s^3}{12F} = \frac{2}{3} \frac{R \sin^3 a}{\frac{a^2 \pi}{180} - \sin a \cos a} \times F$$

## PARABOL PARÇASI



$$OS = \frac{3}{5} x : SS_1 = \frac{3}{8} Y$$

## PRİZMA

Üst ve alt yüzeylerin ağırlık merkezlerini birleştiren doğrunun orta noktası

## PİRAMİT

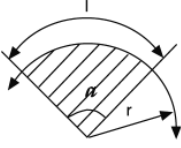
Tepe noktasını taban ağırlık merkezine birleştiren doğru üzerinde tabandan itibaren yüksekliğin dörtte birinde

## KONİ

Tepe noktasını taban ağırlık merkezine birleştiren doğru üzerinde tabandan itibaren yüksekliğin dörtte birinde

## Alan - Çevre

### DAİRE DİLİMİ



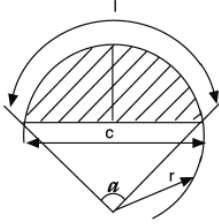
$l$  = Yay boyu,  $\alpha$  = Merkez Açısı,  $r$  = Yarıçap,  $A$  = Alan

$$A = \frac{\pi \times r^2 \times \alpha}{360} = 0.008727 \times \alpha \times r^2$$

$$l = \frac{2 \times \pi \times r \times \alpha}{360} = \frac{\pi \times r \times \alpha}{180}$$

$$\alpha = \frac{57.295 \times l}{r} \quad r = \frac{2 \times A}{l} = 57.295 \times l \div \alpha$$

### DAİRE KESMESİ



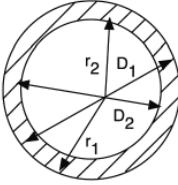
$A$  = Alan,  $l$  = Yay boyu,  $c$  = Kiriş,  $r$  = Yarıçap,  $\alpha$  = Merkez Açısıdır

$$c = 2\sqrt{h(2r-h)} \quad l = 0.01745 \times r \times \alpha$$

$$h = r - \frac{1}{2}\sqrt{4r^2 - c^2} \quad r = (c^2 + 4h^2) \div 8h$$

$$\alpha = 57.295 \times l \div r \quad A = \frac{r \times l}{2} - \frac{c(r-h)}{2}$$

### DAİRE HALKASI



$D_1$  ve  $D_2$  = Büyük ve küçük dairelerin çapları

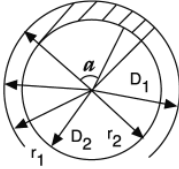
$r_1$  ve  $r_2$  = Büyük ve küçük dairelerin yarıçapları

$A$  = Dairesel halkanın alanıdır.

$$A = \frac{\pi}{4} (D_1^2 - D_2^2)$$

$$A = \frac{\pi}{4} (D_1 + D_2) (D_1 - D_2) \quad A = \pi (r_1^2 - r_2^2) \text{ olur}$$

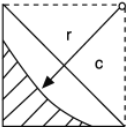
### HALKA PARÇASI



$A$  = Parça Alanı,  $\alpha$  = Merkez Açısıdır.

$$A = \frac{\alpha \pi}{360} (r_1^2 - r_2^2)$$

### TARALI ALAN



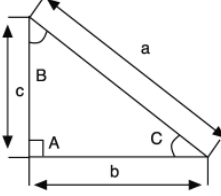
$A$  = Alan,  $c$  = Kiriş boyudur.

$$A = r^2 - \left( \frac{\pi \times r^2}{4} \right) = 0.125 \times r^2 = \frac{1}{2} r^2$$

$$A = 0.1075 \times c^2$$

## Alan - Çevre

### DİK ÜÇGEN

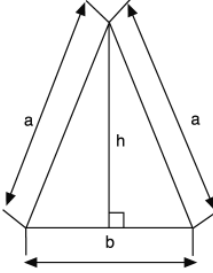


A= Alan, a= Hipotenüs, b ve c = Dik Kenarlar

$$A = \frac{b \times c}{2} \quad a = \sqrt{b^2 + c^2}$$

$$b = \sqrt{a^2 - c^2} \quad c = \sqrt{a^2 - b^2} \quad \text{Ç} = a + b + c$$

### İKİZKENAR ÜÇGEN

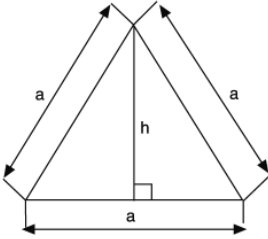


$$A = \frac{h \times b}{2} \quad \text{Ç} = b + 2 \times a_2$$

$$a = \sqrt{\left(\frac{b}{2}\right)^2 + h^2} \quad h = \sqrt{a^2 - \left(\frac{b}{2}\right)^2}$$

$$b = 4\sqrt{a^2 - h^2}$$

### EŞİTKENAR ÜÇGEN

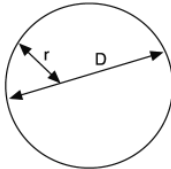


$$A = \frac{a \times h}{2} \quad A = 0.433 \times a^2$$

$$\text{Ç} = 3 \times a$$

$$h = \frac{a\sqrt{3}}{2}$$

### DAİRE



D= Çap, r = Yarıçap, A= Alan, Ç= Çevre

$$A = \pi \times r^2 = \frac{\pi \times D^2}{4} = 0.785398 \times D^2$$

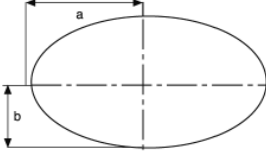
$$D = \frac{2\sqrt{A}}{\sqrt{\pi}} = 1.128379 \quad \sqrt{A} \quad \sqrt{\pi} = 1.7724539$$

$$D = \frac{\text{Ç}}{\pi} = 3.141593 \times \text{Ç}$$

$$\text{Ç} = 2 \times \pi \times r = \pi \times D = 3.141593 \times D$$

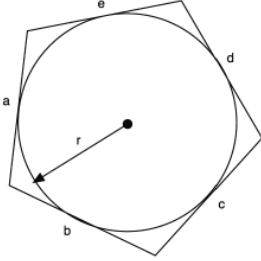
## Alan - Çevre

### ELİPS



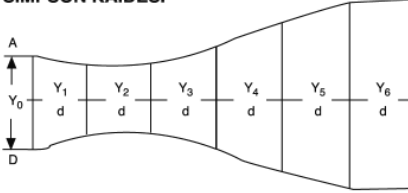
A = Alan, a = Büyük Yarıçap, b = Küçük Yarıçap  
 $A = \pi \times a \times b$   $\text{Ç} = \pi (a + b)$  (yaklaşık)  
 $\text{Ç} = \pi [ 1.5 (a + b) - \sqrt{ab} ]$  (daha iyi yaklaşık)

### DAİRENİN DIŞINA ÇİZİLEN HERHANGİ BİR ÇOKGEN



A = Alan, r = Dairenin Yarıçapı, ve  
a, b, c, d, e = Çokgenin Kenarları  
 $A = 1/2 (a+b+c+d+e) \times r$   
 $\text{Ç} = a + b + c + d + e$

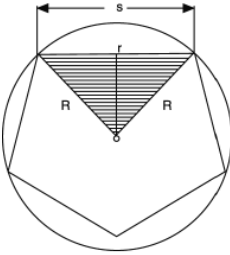
### SİMPSON KAİDESİ



A, B, C, D, Alanı : iki bitişik dilimi sınırlayan eğri parçası bir parabol yayı olarak alınabilecek küçük d genişliğinde eşit dilimlere ayrılır ve şu formül ile hesaplanır.

$$F = d/3 [ Y_0 + Y_n + 2 ( Y_2 + Y_4 + \dots ) + 4 ( Y_1 + Y_3 + \dots ) ]$$

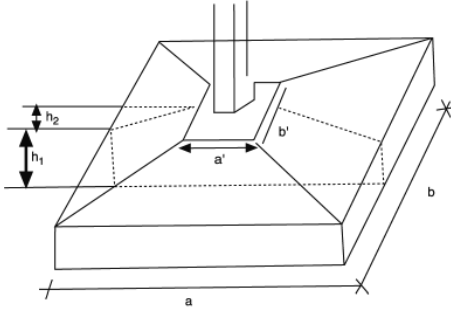
### EŞİTKENAR ÇOKGEN ( Kenar Sayısı : n )



Kenar Sayısı	Alan : F			Kenar : s		Dış daire Yarıçapı : R		İç daire Yarıçapı : r	
	$\frac{F}{s^2}$	$\frac{F}{R^2}$	$\frac{F}{r^2}$	$\frac{s}{R}$	$\frac{s}{r}$	$\frac{R}{s}$	$\frac{R}{r}$	$\frac{r}{R}$	$\frac{r}{s}$
3	0.4330	1.2990	5.1962	1.7321	3.4641	0.5774	2.000	0.5000	0.2887
4	1.000	2.0000	4.000	1.4142	2.000	0.7071	1.4142	0.7071	0.5000
5	1.7205	2.3776	3.6327	1.1756	1.4531	0.8507	1.2361	0.8090	0.6882
6	2.5981	2.5981	3.4641	1.000	1.1547	1.000	1.1547	0.8660	0.8660
8	4.8284	2.8284	3.3137	0.7654	0.8284	1.3066	1.0824	0.9239	1.2071
10	7.6942	2.9389	3.2492	0.6180	0.6498	1.6180	1.0515	0.9511	1.5388
12	11.196	3.0000	3.2154	0.5176	0.5359	1.9319	1.0353	0.9659	1.8660

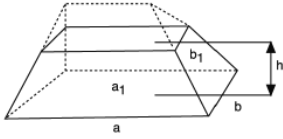
## Hacimler

### DİKDÖRTGEN PİRAMİTİN HACMİ (Temel Şekil)



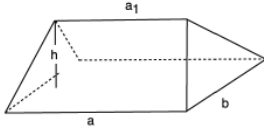
Alt Taban Alanı  
 $A_1 = a \times b$   
 Alt Taban Alanı  
 $A_2 = a' \times b'$   
 $V = A_1 \times h_1 + 1/3 h_2 [ A_1 + A_2 + \sqrt{A_1 \times A_2} ]$

### KUM FIGÜRESİ VEYA SÖMEL OBELİSK



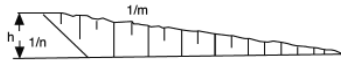
$V = h/6 [ a \times b + ( a + a_1 ) ( b + b_1 ) + a_1 + b_1 ]$   
 Örnek ;  
 $a = 8\text{m}, b = 6\text{m}, h = 1\text{m}$  Eğim 1:1.5  
 $a_1 = 8 - 2 \times 1 \times 1.5 = 5\text{m}$   
 $b_1 = 6 - 2 \times 1 \times 1.5 = 3\text{m}$   
 $V = 1/6 [ 8 \times 6 + ( 8 + 5 ) ( 6 + 3 ) + 5 + 3 ] = 30\text{m}^3$

### ÇATI (Kama)

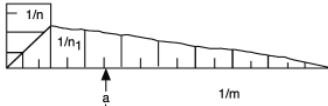


$V = \frac{h \times b}{6} ( 2 \times a + a_1 )$

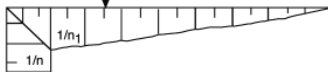
### RAMPA



$V = \frac{h^2}{6} [ 3 \times a + 2 n_1 \times h \frac{m-n}{m} ] ( m - n )$



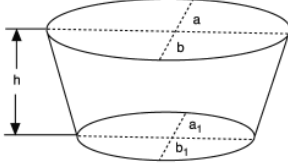
Örnek :  
 $h = 1.5\text{m}$   
 $a = 2.5, m = 12, n = n_1 = 1$   
 $V = \frac{1.5^2}{6} [ ( 3 \times 2.5 ) + 2 \times 1 \times 1.5 \frac{12-1}{12} ] ( 12 - 1 )$   
 $= 42.28\text{m}^3$





## Hacimler

### TEKNE



a, b, a<sub>1</sub>, b<sub>1</sub> Elips yarım eksenleri

$$V = \frac{\pi \times h}{6} [(2 \times a + a_1) b + (2a_1 + a) b_1]$$

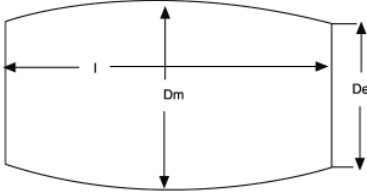
Örnek:

$$a = 45 \text{ cm}, a_1 = 40 \text{ cm}$$

$$b = 25 \text{ cm}, b_1 = 20 \text{ cm}, h = 50 \text{ cm}$$

$$V = \frac{\pi \times 50}{6} [(2 \times 45 + 40) 25 + (2 \times 40 + 45) \times 20] \\ = 150.5 \text{ litre}$$

### FIÇI



Daire Kesiti

$$V = \frac{\pi \times l}{12} (2 Dm^2 + De^2)$$

Parabol Kesitli

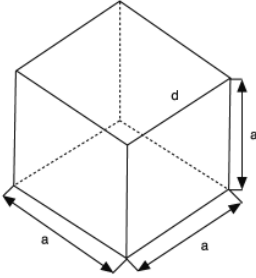
$$V = \frac{1}{15} (2 Dm^2 + Dm^2 \times De + 3 De^2)$$

Örnek:

$$De = 50 \text{ cm}, Dm = 70 \text{ cm}, l = 100 \text{ cm}$$

$$V = \frac{\pi \times 100}{12} (2 \times 70^2 + 50^2) \text{ cm}^3 = 321.91 \text{ litre}$$

### KÜP



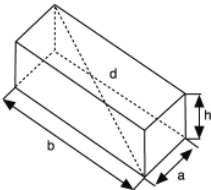
V = Hacim, A= Küpün yüzey Alanı, d = Köşegenidir.

$$V = a^3 \quad a = \sqrt[3]{\frac{A}{6}} = \sqrt[3]{\frac{V}{a^3}}$$

$$A = 6 \times a^2$$

$$d = a \sqrt{3}$$

### DİKDÖRTGENLER PRİZMASI



V = Hacim, A= Küpün yüzey Alanı, d = Köşegenidir.

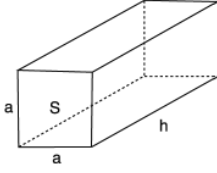
$$V = a \times b \times h$$

$$A = 2 \times ab + 2 \times ah + 2 \times bh = 2 \times (ab + ah + bh)$$

$$d = \sqrt{a^2 + b^2 + h^2}$$

# Hacimler

## KARE PRİZMA



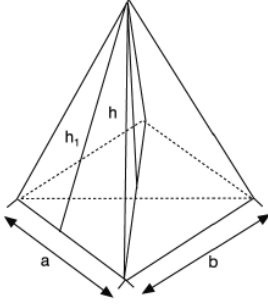
V = Hacim, S = Taban Alanıdır, A = Prizmanın Yüzey Alanı

$$V = S \times h$$

$$A = 2 \times a^2 + 4 \times a \times h \text{ ya da}$$

$$A = 2a(a + 2h)$$

## PİRAMİT

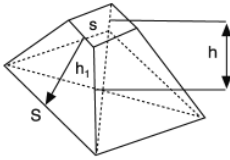


S = Taban Alanı, A = Piramitin Tüm Yüzeyi, V = Hacimdir.

$$V = \frac{a \times b \times h}{3} = \frac{S \times h}{3}$$

$$A = ab + ah_1 + bh_1$$

## KESİK PİRAMİT

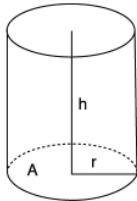


S = Taban Alanı, s = Üst Tabanın Alanı,

h = Piramitin Yüksekliği, h1 = Yanal Yüzlerin Yüksekliği, V = Hacimdir.

$$V = \frac{h}{3} (S + s + \sqrt{Ss})$$

## SİLİNDİR



S = Taban Alanı, A = Silindirin Tüm Yüzeyi, V = Hacim

h = Silindirin Yüksekliği, r = Silindir Taban Dairesi Yarıçapı

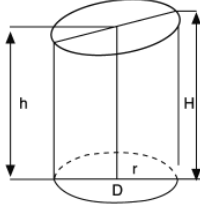
$$V = S \times h$$

$$V = \pi \times r^2 \times h = \frac{\pi \times D^2}{4} = 0.785398 \times D^2 \times h$$

$$A = 2 \times \pi \times r^2 + 2 \times \pi \times r \times h = 2 \pi r (r + h) = 6.28 \times r (r + h)$$

## Hacimler

### SİLİNDİR PARÇASI



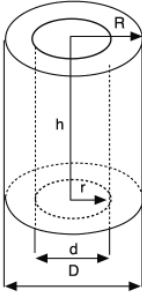
D = Silindirin Taban Dairesi Çapı

S = Silindir Parçasının Yanal Yüzeyinin Alanı

r = Taban Dairesi Yarıçapı, V= Hacim, H ve h= Yüksekliklerdir.

$$V = 1.5708 \times r^2 \times (H + h)$$

### İÇİ BOŞ SİLİNDİR



S = Dış Yanal Yüzün Alanı, S<sub>1</sub> = İç Yanal Yüzün Alanı,

D ve d = Büyük ve Küçük Silindirin Çapları,

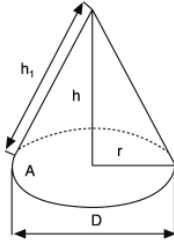
R ve r = Büyük ve Küçük Silindirin Yarıçapları

V = Hacim

$$V = \pi \times R^2 \times h - \pi \times r^2 \times h = (R^2 - r^2) \pi \times h$$

$$S = \pi \times D \times h \quad S_1 = \pi \times d \times h$$

### KONİ

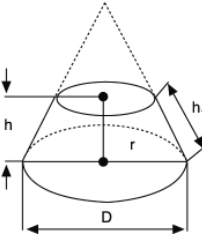


S = Koninin Yanal Yüzeyinin Alanı, V = Hacimdir.

$$S = \pi \times r \sqrt{r^2 + h^2} = \pi \times r \times h_1 = 1.5708 \times D \times h_1$$

$$V = \frac{\pi \times r^2 \times h}{3} = 1.0472 \times r^2 \times h = 0.2618 \times D^2 \times h$$

### KESİK KONİ



S = Yanal Yüzeyin Alanı, D ve d = Üst ve Alt tabanların Çapları,

h ve h<sub>1</sub> = Koni ve Yanal Yüzün Yükseklikleri, V = Hacimdir.

$$S = \pi \times h_1 \times (R + r) = 1.570796 \times h_1 \times (D + d)$$

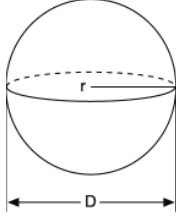
$$V = 1.0472 \times h \times (R^2 + r^2 + Rr)$$

$$a = R - r \text{ olduğundan}$$

$$h_1 = \sqrt{a^2 + h^2} = \sqrt{(R - r)^2 + h^2} \text{ olur.}$$

## Alan - Hacim

### SİLİNDİR PARÇASI



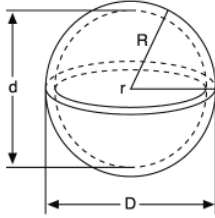
A = Kürenin Dış Yüzeyinin Alanı, r = Yarıçap ve V = Hacimdir.

$$A = 4 \pi r^2$$

$$A = 12.566371 \times r^2 = \pi \times D^2$$

$$V = \frac{4 \pi r^3}{3} = 4.188790 \times r^3 = \frac{\pi}{6} D^3 = 0.5236 \times D^3$$

### İÇİ BOŞ KÜRE



V = Hacim, A = Kürenin Tüm Alanı,

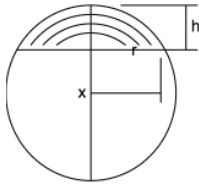
D ve d = Dış ve İç Çaplar,

R ve r = Dış ve İç Yarıçaplar

$$V = \frac{4}{3} \pi (R^3 - r^3)$$

$$V = 4 \pi (R^2 + r^2)$$

### KÜRE PARÇASI



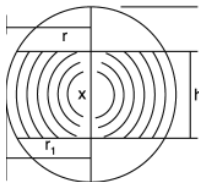
R = Kürenin Yarıçapı, r = Küre Parçasının Yarıçapı

$$V = \frac{\pi x h}{6} = (3r^2 + h^2) \text{ ya da}$$

$$V = 0.523598 \times h (3r^2 + h^2)$$

$$A = 2 \pi R h \text{ veya } A = 2 \pi x R (R - \sqrt{R^2 - r^2})$$

### KÜRESEL BÖLGE

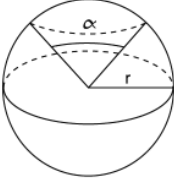


$$V = \frac{\pi x h}{6} = [3(r^2 + r_1^2) + h^2] \text{ ya da}$$

$$V = 0.5236 \times h [3(r^2 + r_1^2) + h^2]$$

## Alan - Hacim

### KÜRESEL KAMA

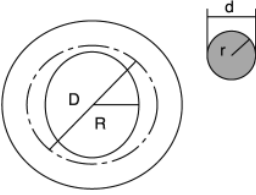


A = Küresel Kamanın Alanı, V = Küresel Kamanın Hacmi

$$V = \frac{\alpha}{360} \times \frac{4 \times \pi \times r^3}{3} = 0.0116 \times \alpha \times r^3$$

$$A = \frac{\alpha}{360} \times 4 \times \pi \times r^2 = \frac{\alpha}{90} \times \pi \times r^2 = 0.0348 \times \pi \times r^2$$

### DAİRESEL KESİTLİ HALKA

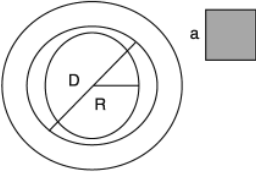


A = Halka Yüzeyinin Alanı, V = Halkanın Hacmi

$$V = 4 \times \pi^2 \times R \times r = 19.739 Rr^2$$

$$A = 4 \times \pi^2 \times Rr = 39.478418 \times Rr$$

### KARE KESİTLİ HALKA

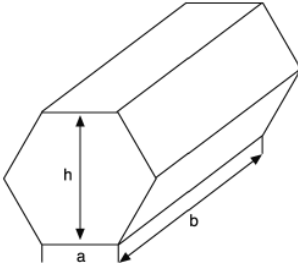


A = Halka Yüzeyinin Alanı, V = Halkanın Hacmi

$$V = 4 \times \pi \times D \times a = 12.566 \times D \times a$$

$$V = \pi \times D \times a^2 = 3.1416 \times D \times a^2$$

### ALTIGEN PRİZMA



A = Yanal Yüzeyinin Alanı, V = Altigen Prizmanın Alanıdır

$$A = 6 \times a \times b \text{ ya da } A = 3.46 \times h \times b$$

$$V = 2.6 \times a^2 \times b \text{ ya da}$$

$$V = 0.866 \times h^2 \times b$$