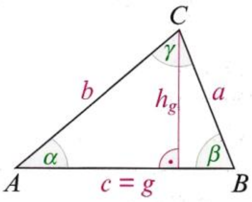
Ebene Figuren

Allgemeines Dreieck



$u = a + b + c$

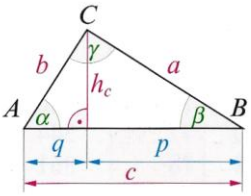
$A = \frac{1}{2}\, g \cdot h_g = \frac{1}{2}\, a\,b \cdot \sin\gamma$

$\alpha + \beta + \gamma = 180°$

$\frac{a}{\sin\alpha} = \frac{b}{\sin\beta} = \frac{c}{\sin\gamma}$

$c^2 = a^2 + b^2 - 2\,a\,b \cdot \cos\gamma$

Rechtwinkliges Dreieck ($\gamma = 90°$)



$A = \frac{1}{2}\, a\,b$

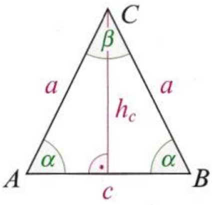
$a^2 + b^2 = c^2;\ h_c^2 = p \cdot q$

$a^2 = p \cdot c;\ b^2 = q \cdot c$

$\sin\alpha = \frac{a}{c};\ \cos\alpha = \frac{b}{c};$

$\tan\alpha = \frac{a}{b};\ \cot\alpha = \frac{b}{a}$

Gleichschenkliges Dreieck



$u = 2a + c;$

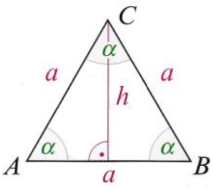
$\beta = 180° - 2\,\alpha$

$h_c = \sqrt{a^2 - \frac{1}{4}\,c^2}$

$A = \frac{1}{2}\, c \cdot h_c$

1 Symmetrieachse

Gleichseitiges Dreieck



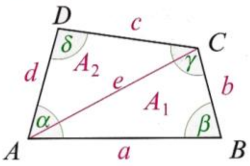
$u = 3\,a$

$A = \frac{a^2}{4}\,\sqrt{3}$ mit $h = \frac{a}{2}\,\sqrt{3}$

$\alpha = 60°$

3 Symmetrieachsen

Allgemeines Viereck

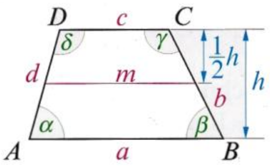


$u = a + b + c + d$

$A = A_1 + A_2$

$\alpha + \beta + \gamma + \delta = 360°$

Trapez ($a \parallel c$)

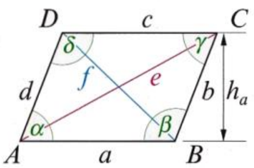


$A = \frac{1}{2}\,(a + c) \cdot h = m \cdot h$

$m = \frac{1}{2}\,(a + c)$

$\alpha + \delta = 180°; \beta + \gamma = 180°$

Parallelogramm ($a \parallel c;\ b \parallel d$)



$u = 2(a + b)$

$A = a \cdot h_a = b \cdot h_b$

$A = a\,b \cdot \sin\alpha$

$\quad = a\,b \cdot \sin\beta$

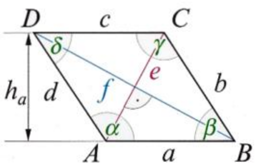
$a = c;\ b = d$

$\beta = \delta;\ \alpha + \beta = 180°$

$\alpha = \gamma;\ \alpha + \delta = 180°$

Die Diagonalen halbieren einander. Es gibt keine Symmetrieachse.

Rhombus – Raute ($a \parallel c;\ b \parallel d$)



$u = 4a$

$A = a \cdot h_a$

$A = \frac{1}{2}\, e \cdot f;\ e \perp f$

$A = a^2 \cdot \sin\alpha = \alpha^2 \cdot \sin\beta$

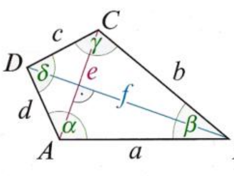
$a = b = c = d$

$\alpha = \gamma;\ \beta = \delta$

$\alpha + \beta = 180°$

Die Diagonalen halbieren einander und sie stehen senkrecht aufeinander. Es gibt 2 Symmetrieachsen.

Drachenviereck ($a = b;\ c = d$)



$u = 2(a + d)$

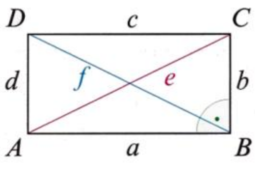
$A = \frac{1}{2}\, e \cdot f$

$\alpha = \gamma;\ e \perp f$

1 Symmetrieachse

Die Diagonalen stehen senkrecht aufeinander, eine Diagonale wird halbiert.

Rechteck ($a \parallel c;\ b \parallel d;\ a \perp b$)



$u = 2(a + b)$

$A = a\,b$

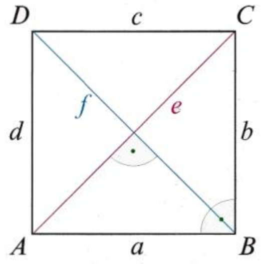
$a = c, b = d; e = f$

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

$\alpha = \beta = \gamma = \delta = 90°$

Die Diagonalen sind gleich lang und sie halbieren einander. Es gibt 2 Symmetrieachsen.

Quadrat ($a \parallel c$; $b \parallel d$; $a \perp b$)



$u = 4a$

$A = a^2$

$a = b = c = d$

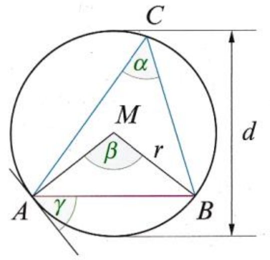
$\alpha = \beta = \gamma = \delta = 90°$

$e = f$; $e \perp f$; $e = a\sqrt{2}$

4 Symmetrieachsen

Die Diagonalen sind gleich lang, sie halbieren einander und stehen senkrecht aufeinander.

Kreis (r – Radius)



$u = 2\pi r = \pi d$

$A = \pi r^2 = \frac{1}{4}\pi d^2$

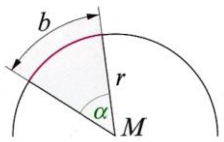
$\alpha = \frac{\beta}{2}$; $\alpha = \gamma$

α Peripheriewinkel

β Zentriwinkel über $\widehat{AB}$

γ Sehnen-Tangenten-Winkel

Kreisbogen

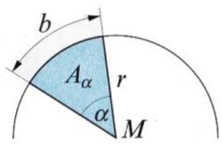


$b : u = \alpha : 360°$

$b = \frac{\pi r}{180°}\,\alpha$

$b = r \cdot \operatorname{arc} \alpha$

Kreisausschnitt (Sektor)



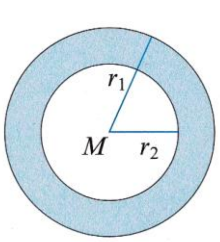
$A_\alpha : A = \alpha : 360°$

$= \operatorname{arc} \alpha : 2\pi$

$A_\alpha = \frac{\pi}{360°}\,\alpha r^2$

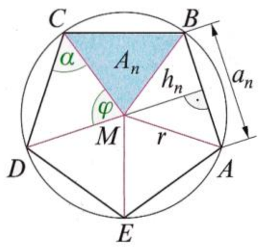
$A_\alpha = \frac{1}{2}\,b \cdot r = \frac{1}{2}\,r^2 \operatorname{arc} \alpha$

Kreisring ($r_1 > r_2$)



$A = \pi\,(r_1^2 - r_2^2)$

Regelmäßiges *n*-Eck



$u = n \cdot a_n$; $A = n \cdot A_n$

$\varphi = \frac{360°}{n}$; $\alpha = \frac{180° - \varphi}{2}$

$h_n^2 = r^2 - \left(\frac{1}{2}\,a_n\right)^2$

$a_n = 2r \cdot \sin\frac{\varphi}{2}$

$A_n = \frac{1}{2}\,r^2 \cdot \sin\varphi$

Quelle: "Das große Tafelwerk" Cornelsen Verlag