Mathematik

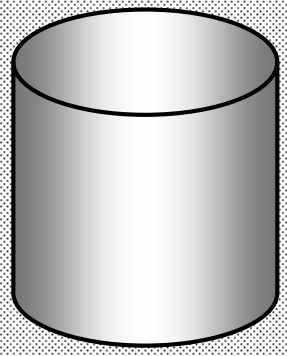
Saarland

Ministerium für Bildung

Formelsammlung

$$x+3$$

$$\sqrt{45}$$

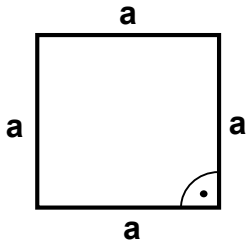


Ausgabe August 2011

Nur diese Formelsammlung darf bei der Prüfung 2012 benutzt werden.

Flächen: Flächeninhalt A und Umfang U

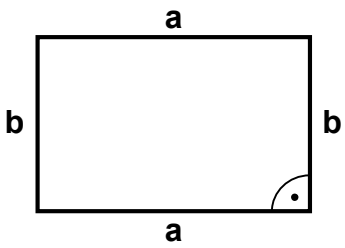
Quadrat



$A = a^2$

$U = 4\,a$

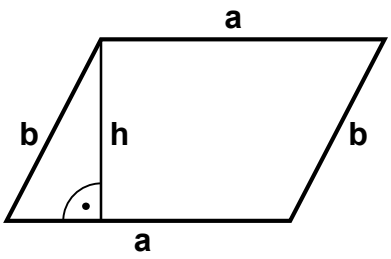
Rechteck



$A = a \cdot b$

$U = 2\,a + 2\,b$
$= 2\,(a+b)$

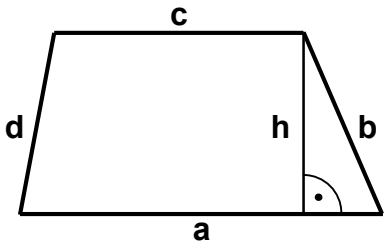
Parallelogramm



$A = a \cdot h$

$U = 2\,a + 2\,b$
$= 2\,(a+b)$

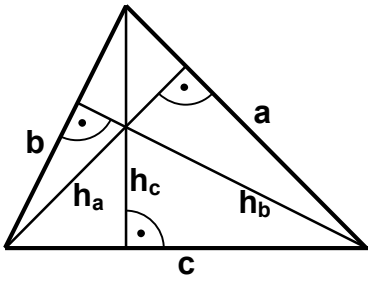
Trapez



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

$U = a + b + c + d$

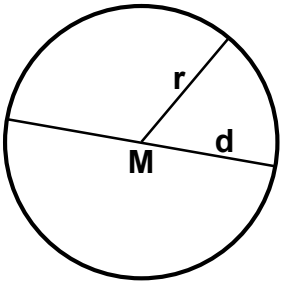
Dreieck



$A = \frac{a \cdot h_a}{2}$
$= \frac{b \cdot h_b}{2}$
$= \frac{c \cdot h_c}{2}$

$U = a + b + c$

Kreis

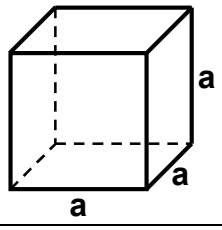


$A = \pi\,r^2$
$= \frac{\pi}{4}\,d^2$

$U = 2\,\pi\,r$
$= \pi\,d$

Körper: Volumen V, Oberfläche O, Grundfläche A_G, Mantelfläche M

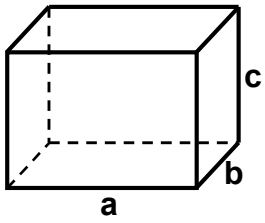
Würfel



$V = a^3$

$O = 6\,a^2$

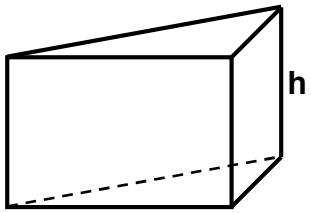
Quader



$V = a \cdot b \cdot c$

$O = 2\,a\,b + 2\,a\,c + 2\,b\,c$

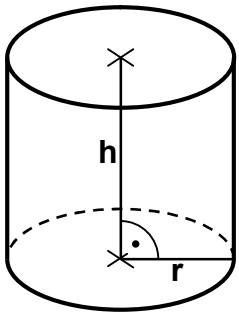
Prisma



$V = A_G \cdot h$

$O = 2\,A_G + M$

Zylinder

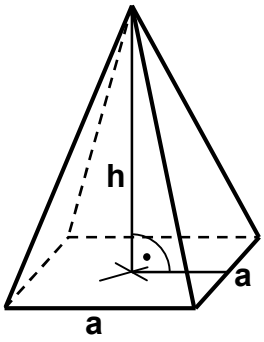


$V = A_G \cdot h$
$= \pi\,r^2\,h$

$O = 2\,A_G + M$
$= 2\,\pi\,r\,(r+h)$

$M = 2\,\pi\,r\,h$

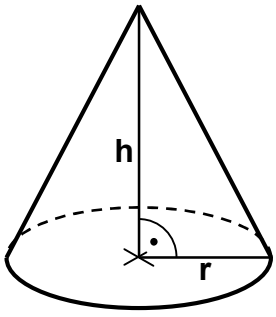
Quadratische Pyramide



$V = \frac{1}{3} A_G \cdot h$

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

Kegel

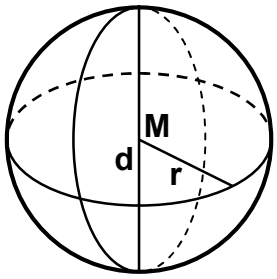


$V = \frac{1}{3} A_G \cdot h$

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

$M = \pi\,r\,s$

Kugel



$V = \frac{4}{3} \pi\,r^3$

$= \frac{1}{6} \pi\,d^3$

$O = 4\,\pi\,r^2$
$= \pi\,d^2$

Quadratische Gleichungen

Allgemeine Form

$$a x^2 + b x + c = 0$$

Lösungsformel:

$$x_{1,2} = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

Normalform

$$x^2 + p x + q = 0$$

Lösungsformel:

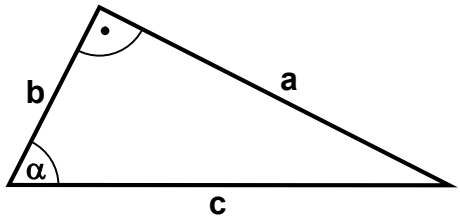
$$x_{1,2} = -\frac{p}{2} \pm \sqrt{\left(\frac{p}{2}\right)^2 - q}$$

Satz des Vieta:

$$x_1 + x_2 = -p$$
$$x_1 \cdot x_2 = q$$

Berechnungen im Dreieck

Rechtwinkliges Dreieck



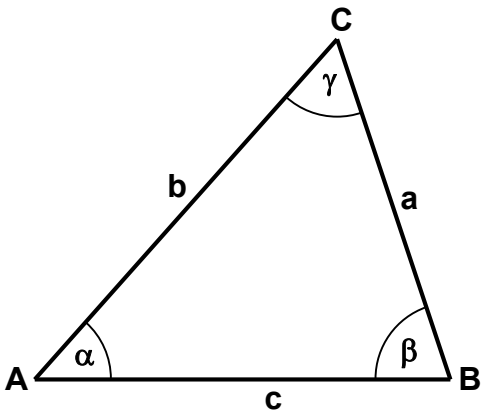
Satz des Pythagoras:

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

Winkelfunktionen:

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

Allgemeines Dreieck



Sinussatz:

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

Kosinussatz:

$$a^2 = b^2 + c^2 - 2bc\cos\alpha$$
$$b^2 = a^2 + c^2 - 2ac\cos\beta$$
$$c^2 = a^2 + b^2 - 2ab\cos\gamma$$

Flächeninhalt:

$$A = \frac{1}{2}bc\sin\alpha = \frac{1}{2}ac\sin\beta = \frac{1}{2}ab\sin\gamma$$

Exponentielles Wachstum

$$W_n = W_0 \cdot q^n$$

oder

$$K_n = K_0 \cdot q^n$$

$$q = 1 + \frac{p}{100} \text{ (Zunahme)}$$

$$q = 1 - \frac{p}{100} \text{ (Abnahme)}$$

Logarithmengesetze

Für alle $u, v \in \mathbb{R}^+$ gilt:

$$\log_a(u \cdot v) = \log_a u + \log_a v$$

$$\log_a\left(\frac{u}{v}\right) = \log_a u - \log_a v$$

$$\log_a u^k = k \cdot \log_a u; \qquad k \in \mathbb{R}$$