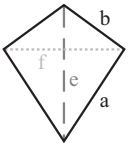
1. Geometrie

1.1 Geometrie in der Ebene

Drachen

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

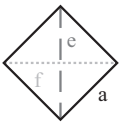
$$u = 2 \cdot (a + b)$$



Raute

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

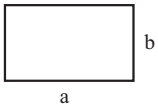
$$u = 4 \cdot a$$



Rechteck

$$A = a \cdot b$$

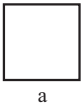
$$u = 2 \cdot (a + b)$$



Quadrat

$$A = a^2$$

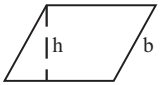
$$u = 4 \cdot a$$



Parallelogramm

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

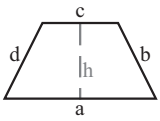
$$u = 2 \cdot (a + b)$$



Trapez

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

$$u = a + b + c + d$$



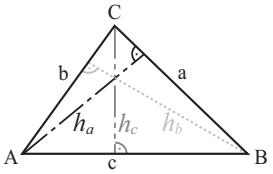
allgemeines Dreieck

$$A = \frac{1}{2} \cdot a \cdot h_a$$

$$= \frac{1}{2} \cdot b \cdot h_b$$

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

$$u = a + b + c$$

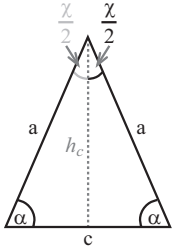


gleichschenkliges Dreieck

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

$$h_c = \sqrt{a^2 - \left(\frac{c}{2}\right)^2}$$

$$u = 2 \cdot a + c$$

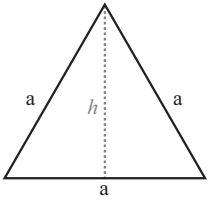


gleichseitiges Dreieck

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

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

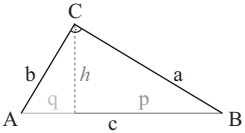
$$u = 3 \cdot a$$



rechtwinkliges Dreieck

$$A = \frac{1}{2} \cdot c \cdot h_c = \frac{1}{2} \cdot c \cdot \sqrt{p \cdot q} = \frac{1}{2} a \cdot b$$

$$u = a + b + c$$



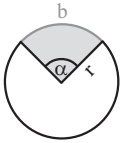
Kreis

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

$$u = 2 \cdot \pi \cdot r$$

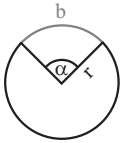
Kreisausschnitt

$$A = \frac{b \cdot r}{2} = \frac{\pi \cdot r^2 \cdot \alpha}{360}$$



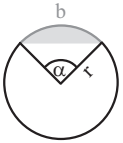
Kreisbogen

$$b = \frac{\pi \cdot r \cdot \alpha}{180}$$



Kreisabschnitt

$$A = \frac{r^2}{2} \cdot \left(\frac{\pi \cdot \alpha}{180} - \sin \alpha \right)$$



1. Geometrie

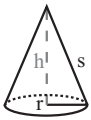
1.2 Geometrie im Raum

Kegel

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

$$M = \pi \cdot r \cdot s$$

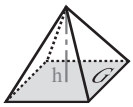
$$O = \pi \cdot r \cdot (r + s)$$



Pyramide

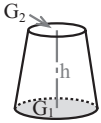
$$V = \frac{1}{3} \cdot G \cdot h$$

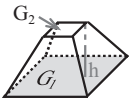
$$O = G + M$$



Kegel-/Pyramidenstumpf

$$V_{St} = \frac{1}{3} \cdot h \cdot \left(G_1 + \sqrt{G_1 \cdot G_2} + G_2\right)$$

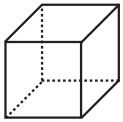




Würfel

$$V = a^3$$

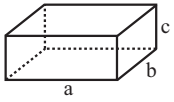
$$O = 6 \cdot a^2$$



Quader

$$V = a \cdot b \cdot c$$

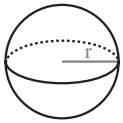
$$O = 2 \cdot (ab + ac + bc)$$



Kugel

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

$$O = 4 \cdot \pi \cdot r^2$$

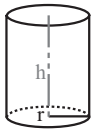


Zylinder

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

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

$$O = 2 \cdot \pi \cdot r \cdot (r + h)$$



2. Pythagoras und Freunde

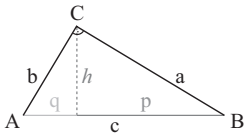
$$c^2 = a^2 + b^2$$

$$h^2 = p \cdot q$$

$$a^2 = c \cdot p$$

$$b^2 = c \cdot q$$

$$c = p + q$$



3. Binomische Formeln

$$(a+b)^2 = a^2 + 2ab + b^2$$

$$(a-b)^2 = a^2 - 2ab + b^2$$

$$(a+b) \cdot (a-b) = a^2 - b^2$$

$$(a+b)^3 = a^3 + 3a^2b + 3ab^2 + b^3$$

$$(a-b)^3 = a^3 - 3a^2b + 3ab^2 - b^3$$

4. Quadratische Gleichungen

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

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

$$ax^2 + bx + c = 0$$

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

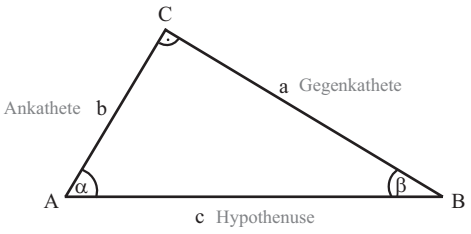
5. Trigonometrie

$$\sin\alpha = \frac{GK}{Hyp}$$

$$\cos\alpha = \frac{AK}{Hyp}$$

$$\tan\alpha = \frac{GK}{AK}$$

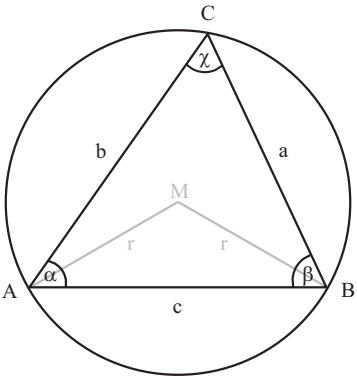
$$\cot\alpha = \frac{AK}{GK}$$



$$\cos^2\alpha + \sin^2\alpha = 1$$

$$\tan\alpha = \frac{\sin\alpha}{\cos\alpha}$$

$$\cot\alpha = \frac{\cos\alpha}{\sin\alpha} = \frac{1}{\tan\alpha}$$



Sinussatz

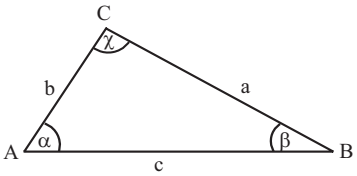
$$\frac{a}{\sin\alpha} = \frac{b}{\sin\beta} = \frac{c}{\sin\chi} = 2r$$

Cosinussatz

$$a^2 = b^2 + c^2 - 2bc\cdot\cos\alpha$$

$$b^2 = a^2 + c^2 - 2ac\cdot\cos\beta$$

$$c^2 = a^2 + b^2 - 2ab\cdot\cos\chi$$



Winkelsumme im n-Eck

$$(n-2)\cdot 180^0$$

besondere Werte

	0 0°	$\pi/6$ 30°	$\pi/4$ 45°	$\pi/3$ 60°	$\pi/2$ 90°
sin	0	$1/2$	$1/2\sqrt{2}$	$1/2\sqrt{3}$	1
cos	1	$1/2\sqrt{3}$	$1/2\sqrt{2}$	$1/2$	0
tan	0	$1/3\sqrt{3}$	1	$\sqrt{3}$	-
cot	-	$\sqrt{3}$	1	$1/3\sqrt{3}$	0

6. Potenzen & wurzeln

Potenzen

$$a^n \cdot a^m = a^{n+m}$$
$$a^n \div a^m = a^{n-m}$$
$$\left(a^n\right)^m = a^{n \cdot m}$$
$$a^{\frac{n}{m}} = \sqrt[m]{a^n}$$
$$a^0 = 1$$
$$a^{-n} = \frac{1}{a^n}$$
$$a^n \cdot b^n = (a \cdot b)^n$$
$$a^n \div b^n = (a \div b)^n$$

Wurzeln

$$\sqrt[n]{a} \cdot \sqrt[n]{b} = \sqrt[n]{a \cdot b}$$
$$\sqrt[n]{a} \div \sqrt[n]{b} = \sqrt[n]{\frac{a}{b}}$$
$$\left(\sqrt[n]{a}\right)^m = \sqrt[n]{a^m} = \sqrt[kn]{a^{km}}$$
$$\sqrt[m]{\sqrt[n]{a}} = \sqrt[mn]{a} = \sqrt[n]{\sqrt[m]{a}}$$

7. Logarithmen

$$b^x = c \Leftrightarrow x = \log_b c$$

$$\log_b b = 1 \qquad \log_{10} u = \lg u$$
$$\log_b 1 = 0 \qquad \log_e u = \ln u$$
$$\log_b b^u = u \qquad \log_2 u = lbu$$

$$\log_b (u \cdot v) = \log_b u + \log_b v$$
$$\log_b (u \div v) = \log_b u - \log_b v$$
$$\log_b u^n = n \cdot \log_b u$$

8. Zinsrechnung

Zins

$$Z = \frac{K \cdot p \cdot t}{100 \cdot 360}$$

Z: Zinsen
K: Kapital
p: Prozentsatz
t: Zeit in Tagen

Zinseszins

$$K_n = K_0 \cdot (1 + \frac{p}{100})^n$$

K_n: Endkapital
K_0: Anfangskapital
p: Prozentsatz
n: Jahre

9. Lineare Gleichungen/Geraden

Hauptform

$$y = mx + b$$

Zwei-Punkte-Form

$$y - y_1 = \frac{y_2 - y_1}{x_2 - x_1} \cdot (x - x_1)$$

Punkt-Steigungs-Form

$$y - y_1 = m \cdot (x - x_1)$$