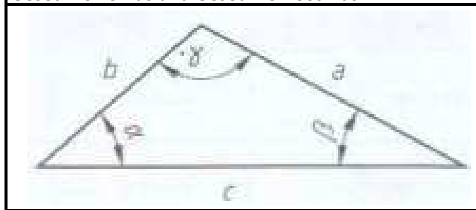
DE =	EN =	PT =	VN =
Winkel			

Trigonometrische Funktionen von schrägen Dreiecke, Winkel, Strahlensatz

Gesetz von Sinus und Gesetz von Cosinus



Sinussatz

$a : b : c = \sin\alpha : \sin\beta : \sin\gamma$

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

Cosinussatz

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

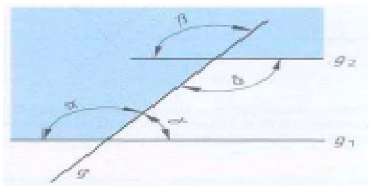
$b^2 = a^2 + c^2 - 2 \cdot a \cdot c \cdot \cos\beta$

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

Anwendung bei der Berechnung der Seiten und Winkel

Berechnung von Seiten		Die Berechnung der Winkel	
mit dem Gesetz der Sinus	mit dem Gesetz der Cosinus	mit dem Gesetz der Sinus	mit dem Gesetz der Cosinus
$a = \frac{b \cdot \sin\alpha}{\sin\beta} = \frac{c \cdot \sin\alpha}{\sin\gamma}$	$a = \sqrt{b^2 + c^2 - 2 \cdot b \cdot c \cdot \cos\alpha}$	$\sin\alpha = \frac{a \cdot \sin\beta}{b} = \frac{a \cdot \sin\gamma}{c}$	$\cos\alpha = \frac{b^2 + c^2 - a^2}{2 \cdot b \cdot c}$
$b = \frac{a \cdot \sin\beta}{\sin\alpha} = \frac{c \cdot \sin\beta}{\sin\gamma}$	$b = \sqrt{a^2 + c^2 - 2 \cdot a \cdot c \cdot \cos\beta}$	$\sin\beta = \frac{b \cdot \sin\alpha}{ein} = \frac{b \cdot \sin\gamma}{c}$	$\cos\beta = \frac{a^2 + c^2 - b^2}{2 \cdot a \cdot c}$
$c = \frac{a \cdot \sin\gamma}{\sin\alpha} = \frac{b \cdot \sin\gamma}{\sin\beta}$	$c = \sqrt{a^2 + b^2 - 2 \cdot a \cdot b \cdot \cos\gamma}$	$\sin\gamma = \frac{c \cdot \sin\alpha}{ein} = \frac{c \cdot \sin\beta}{b}$	$\cos\gamma = \frac{a^2 + b^2 - c^2}{2 \cdot a \cdot b}$

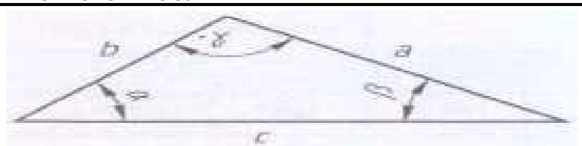
Typen von Winkeln



Wenn zwei Parallelen g_1 und g_2 sind durchschnitten durch eine gerade Linie g, gibt es geometrische Zusammenhänge zwischen den entsprechenden, Gegen-, Wechsel- und Nebenwinkel.

Entsprechende Winkel
$\alpha = \beta$
Gegenwinkel
$\beta = \delta$
Wechselwinkel
$\alpha = \delta$
Nebenwinkel
$\alpha + \gamma = 180^0$

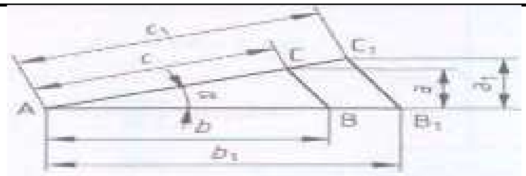
Summe der Winkel in einem Dreieck



In jedem Dreieck die Summe der Innen-Winkel gleich 180^0.

Summe der Winkel
in einem Dreieck
$\alpha + \beta + \gamma = 180^0$

Strahlensatz



Wenn zwei Linien, die sich von Punkt A sind B_1C_1, die Segmente der parallelen Linien und die entsprechenden ray Segmenten die Linien, die sich hin-A bilden gleiche Verhältnisse.

Strahlensatz

$$\frac{a}{a_1} = \frac{b}{b_1} = \frac{c}{c_1}$$

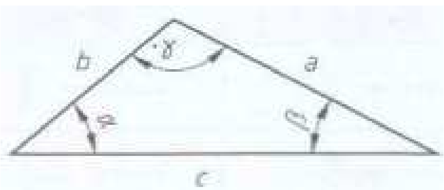
$$\frac{a}{b} = \frac{a_1}{b_1} \qquad \frac{b}{c} = \frac{b_1}{c_1}$$

gezeichnet:	HPW	Datum:		eduction project	Winkel	translate/en_ds/p_ct/vn_ro	orign: MMHE, S. 14
Aenderung:	an	Datum:	18.05.2015	WIAP KFKOK	Angle	r1	datei_wi_8_f_1_7_c_5_r1_14_a_Angle_mathe
Aenderung:	control 2	Data:		Safenwil Schweiz	spear 2	www.wiap.ch	idee of / from HPW

DE =	EN =	PT =	VN =
	Angles		

Trigonometric functions of oblique triangles, Angles, Theorem of intersecting lines

Law of sines and Low of cosines



Law of sines

a : b : c = sin α : sin β : sin γ

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

Law of cosines

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

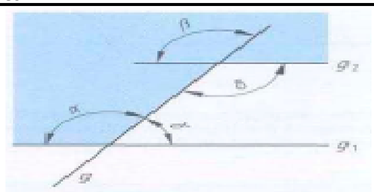
$b^2 = a^2 + c^2 - 2 \cdot a \cdot c \cdot \cos\beta$

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

Application in calculating sides and angles

Calculation of sides: using the Law of sines	Calculation of sides: using the Law of cosines	Calculation of angles: using the Law of sines	Calculation of angles: using the Low of cosines
$a = \frac{b \cdot \sin\alpha}{\sin\beta} = \frac{c \cdot \sin\alpha}{\sin\gamma}$	$a = \sqrt{b^2 + c^2 - 2 \cdot b \cdot c \cdot \cos\alpha}$	$\sin\alpha = \frac{a \cdot \sin\beta}{b} = \frac{a \cdot \sin\gamma}{c}$	$\cos\alpha = \frac{b^2 + c^2 - a^2}{2 \cdot b \cdot c}$
$b = \frac{a \cdot \sin\beta}{\sin\alpha} = \frac{c \cdot \sin\beta}{\sin\gamma}$	$b = \sqrt{a^2 + c^2 - 2 \cdot a \cdot c \cdot \cos\beta}$	$\sin\beta = \frac{b \cdot \sin\alpha}{a} = \frac{b \cdot \sin\gamma}{c}$	$\cos\beta = \frac{a^2 + c^2 - b^2}{2 \cdot a \cdot c}$
$c = \frac{a \cdot \sin\gamma}{\sin\alpha} = \frac{b \cdot \sin\gamma}{\sin\beta}$	$c = \sqrt{a^2 + b^2 - 2 \cdot a \cdot b \cdot \cos\gamma}$	$\sin\gamma = \frac{c \cdot \sin\alpha}{a} = \frac{c \cdot \sin\beta}{b}$	$\cos\gamma = \frac{a^2 + b^2 - c^2}{2 \cdot a \cdot b}$

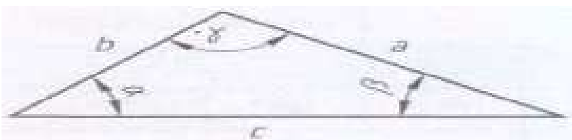
Types of angles



If two parallels g1 and g2 are intersected by a straight line g, there are geometrical interrelationships between the corresponding, opposite, alternate and adjacent angles.

Corresponding angles
$\alpha = \beta$
Opposite angles
$\beta = \delta$
Alternate angles
$\alpha = \delta$
Adjacent angles
$\alpha + \gamma = 180^0$

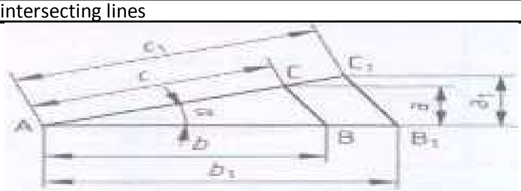
Sum of angles in a triangle



In every triangle the sum of the interior angles equals 180°.

Sum of angles in a triangle
$\alpha + \beta + \gamma = 180^0$

Theorem of intersecting lines



If two lines extending from Point A are B_1C_1, the segments of the parallel lines and the corresponding ray segments of the lines extending fro A form equal ratios.

Theorem of intersecting lines

$$\frac{a}{a_1} = \frac{b}{b_1} = \frac{c}{c_1}$$

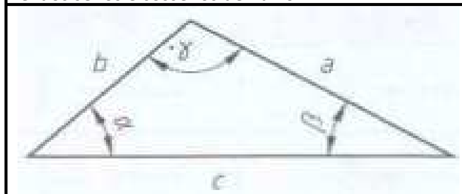
$$\frac{a}{b} = \frac{a_1}{b_1} \qquad \frac{b}{c} = \frac{b_1}{c_1}$$

gezeichnet:	HPW	Datum:		eduction project	Winkel	translate/en_ds/p_ct/vn_ro	orign: MMHE, S. 14
Aenderung:	an	Datum:	18.05.2015	WIAP KFKOK	Angle	r1	datei_wi_8_f_1_7_c_5_r1_14_a_Angle_mathe
Aenderung:	control 2	Data:		Safenwil Schweiz	spear 2	www.wiap.ch	idee of / from HPW

DE =	EN =	PT =	VN =
		Ângulos	

Funções trigonométricas dos triângulos oblíquos, Angles, o Teorema de linhas de interseção

Lei dos senos e cossenos de Baixo



Lei dos senos

$a : b : c = \sin\alpha : \sin\beta : \sin\gamma$

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

Lei dos cossenos

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

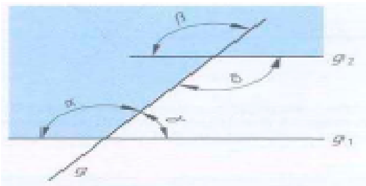
$b^2 = a^2 + c^2 - 2 \cdot a \cdot c \cdot \cos\beta$

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

Aplicação em cálculo lados e ângulos

Cálculo de lados		Cálculo de ângulos	
usando a Lei dos senos	usando a Lei dos cossenos	usando a Lei dos senos	usando a Baixa dos cossenos
$a = \frac{b \cdot \sin\alpha}{\sin\beta} = \frac{c \cdot \sin\alpha}{\sin\gamma}$	$a = \sqrt{b^2 + c^2 - 2 \cdot b \cdot c \cdot \cos\alpha}$	$\sin\alpha = \frac{a \cdot \sin\beta}{b} = \frac{a \cdot \sin\gamma}{c}$	$\cos\alpha = \frac{b^2 + c^2 - a^2}{2 \cdot b \cdot c}$
$b = \frac{a \cdot \sin\beta}{\sin\alpha} = \frac{c \cdot \sin\beta}{\sin\gamma}$	$b = \sqrt{a^2 + c^2 - 2 \cdot a \cdot c \cdot \cos\beta}$	$\sin\beta = \frac{b \cdot \sin\alpha}{a} = \frac{b \cdot \sin\gamma}{c}$	$\cos\beta = \frac{a^2 + c^2 - b^2}{2 \cdot a \cdot c}$
$c = \frac{a \cdot \sin\gamma}{\sin\alpha} = \frac{b \cdot \sin\gamma}{\sin\beta}$	$c = \sqrt{a^2 + b^2 - 2 \cdot a \cdot b \cdot \cos\gamma}$	$\sin\gamma = \frac{c \cdot \sin\alpha}{a} = \frac{c \cdot \sin\beta}{b}$	$\cos\gamma = \frac{a^2 + b^2 - c^2}{2 \cdot a \cdot b}$

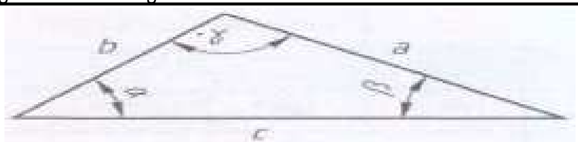
Tipos de ângulos



Se dois paralelos g1 e g2 são cruzaram por uma linha reta g, há geométricas inter-relações entre o corre- correspondente, no lado oposto, alternativo e ângulos adjacentes.

Ângulos correspondentes
$\alpha = \beta$
Ângulos opostos
$\beta = \delta$
Ângulos alternados
$\alpha\ \delta =$
Ângulos adjacentes
$\alpha + \gamma = 180^0$

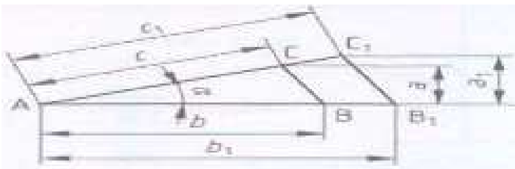
Soma dos ângulos de um triângulo



Em cada triângulo a soma do interior ângulos é igual a 180^0.

Soma dos ângulos
em um triângulo
$\alpha + \beta + \gamma = 180^0$

Teorema de linhas de interseção



Se duas linhas que se estende do ponto A são B1C1, os segmentos das linhas paralelas e os correspondentes segmentos raio de as linhas estendendo fro A rácios forma igual.

Teorema de interseção
linhas

$$\frac{a}{a_1} = \frac{b}{b_1} = \frac{c}{c_1}$$

$$\frac{a}{b} = \frac{a_1}{b_1} \qquad \frac{b}{c} = \frac{b_1}{c_1}$$

gezeichnet:	HPW	Datum:		eduction project	Winkel	translate/en_ds/p_ct/vn_ro	orign: MMHE, S. 14
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Aenderung:	control 2	Data:		Safenwil Schweiz	spear 2	www.wiap.ch	idee of / from HPW

DE =	EN =	PT =	VN =
			Góc

Các hàm lượng giác của hình tam giác xiên, góc, Định lý của các đường giao nhau

Luật sin và thấp cosines

Luật của sin

$a : b : c = \sin\alpha : \sin\beta : \sin\gamma$

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

Luật của cosines

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

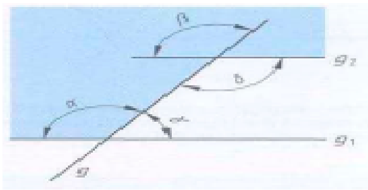
$b^2 = a^2 + c^2 - 2 \cdot a \cdot c \cdot \cos\beta$

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

Áp dụng trong các bên tính toán và góc

Tính toán của các bên: bằng cách sử dụng Luật sin	Tính toán của các bên: bằng cách sử dụng Luật cosines	toán góc độ: bằng cách sử dụng Luật sin	toán góc độ: bằng cách sử dụng thấp cosines
$a = \frac{b \cdot \sin\alpha}{\sin\beta} = \frac{c \cdot \sin\alpha}{\sin\gamma}$	$a = \sqrt{b^2 + c^2 - 2 \cdot b \cdot c \cdot \cos\alpha}$	$\sin\alpha = \frac{a \cdot \sin\beta}{b} = \frac{a \cdot \sin\gamma}{c}$	$\cos\alpha = \frac{b^2 + c^2 - a^2}{2 \cdot b \cdot c}$
$b = \frac{a \cdot \sin\beta}{\sin\alpha} = \frac{c \cdot \sin\beta}{\sin\gamma}$	$b = \sqrt{a^2 + c^2 - 2 \cdot a \cdot c \cdot \cos\beta}$	$\sin\beta = \frac{b \cdot \sin\alpha}{a} = \frac{b \cdot \sin\gamma}{c}$	$\cos\beta = \frac{a^2 + c^2 - b^2}{2 \cdot a \cdot c}$
$c = \frac{a \cdot \sin\gamma}{\sin\alpha} = \frac{b \cdot \sin\gamma}{\sin\beta}$	$c = \sqrt{a^2 + b^2 - 2 \cdot a \cdot b \cdot \cos\gamma}$	$\sin\gamma = \frac{c \cdot \sin\alpha}{a} = \frac{c \cdot \sin\beta}{b}$	$\cos\gamma = \frac{a^2 + b^2 - c^2}{2 \cdot a \cdot b}$

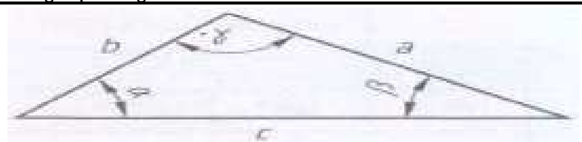
Các loại góc độ



Nếu hai song song với g1 và g2 giao nhau g đường thẳng, hình học mối tương quan giữa-corre sponding, ngược lại, thay thế và liền kề góc.

Tương ứng với góc
$\alpha = \beta$
Đối diện với góc
$\beta = \delta$
Thay thế góc
$\alpha = \delta$
Liền kề góc
$\alpha + \gamma = 180°$

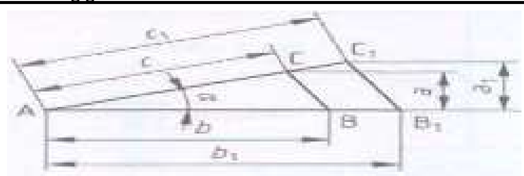
Tổng các góc trong một tam giác



Trong mỗi tam giác tổng hợp của nội thất góc bằng 180°.

Tổng các góc
trong một tam giác
$\alpha + \beta + \gamma = 180°$

Định lý của các đường giao nhau



Nếu hai dòng mở rộng từ điểm A B1C1, các phân đoạn của các đường song song và tia phân đoạn tương ứng của đường mở rộng fro Một tỷ lệ hình thức bình đẳng.

Định lý của giao nhau
đường

$$\frac{a}{a_1} = \frac{b}{b_1} = \frac{c}{c_1}$$

$$\frac{a}{b} = \frac{a_1}{b_1} \qquad \frac{b}{c} = \frac{b_1}{c_1}$$