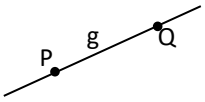
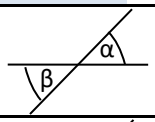
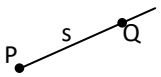
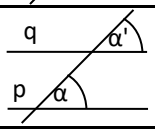
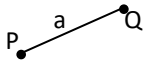
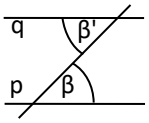
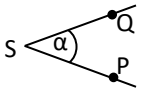
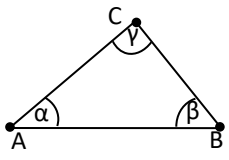
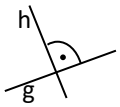
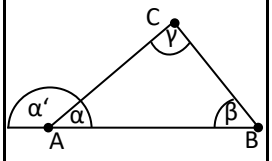
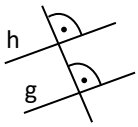
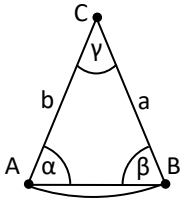
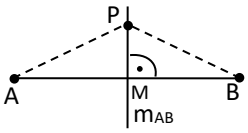
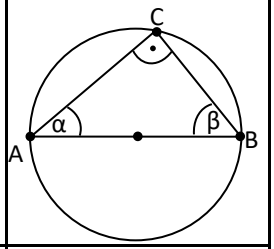
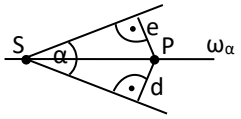
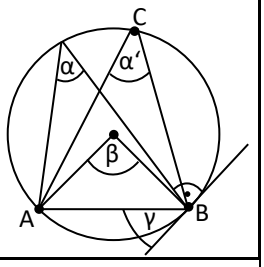
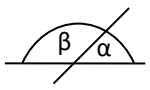
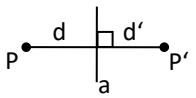
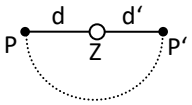
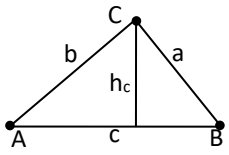
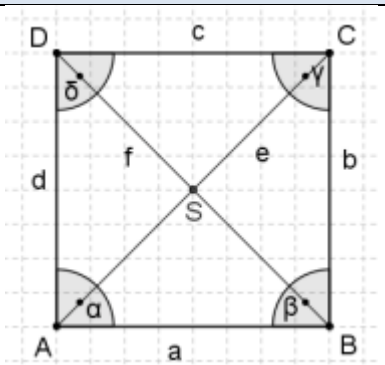
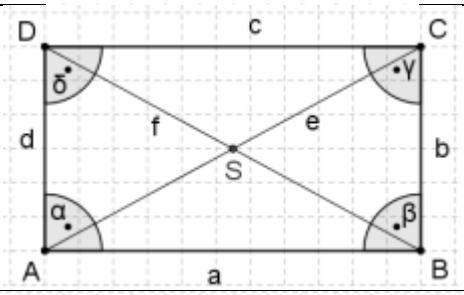
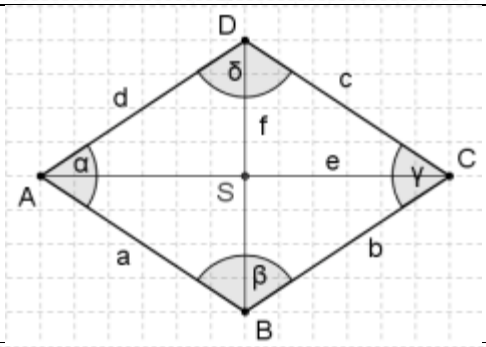
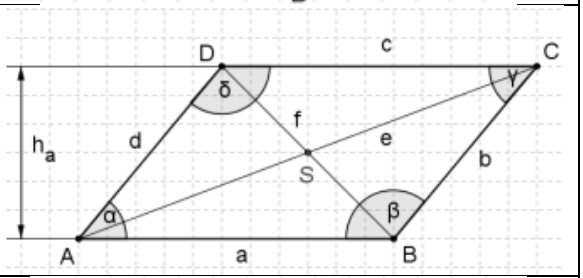
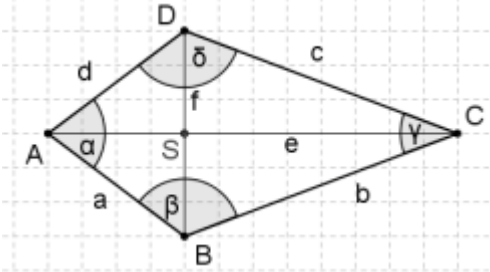
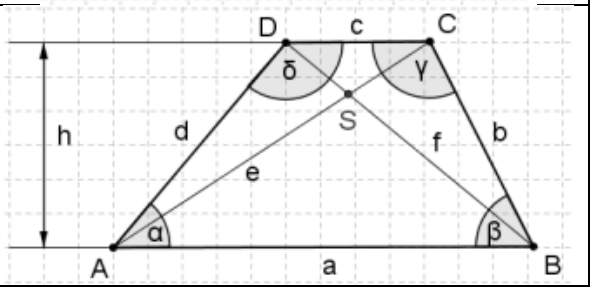
GEOMETRIE

1 Geometrisches Denken

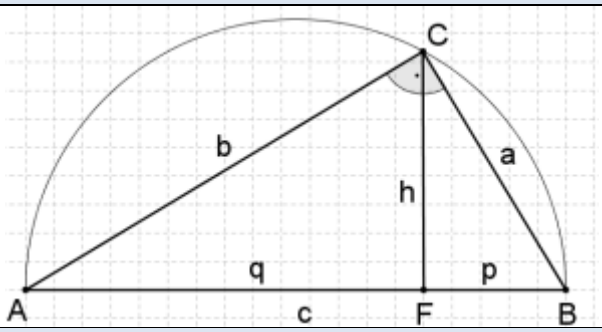
1.1 Grundbegriffe

Gerade	PQ		Scheitelwinkel	α = β	
Strahl	PQ		Stufenwinkel	p ∥ q α=α‘	
Strecke	$\overline{PQ}$		Wechselwinkel	p ∥ q β = β‘	
Winkel	∢ (PSQ)		Innenwinkel	α + β + γ = 180° (n-2)*180°	
Senkrechte Gerade	g ⊥ h		Aussenwinkel	α‘ = β + γ	
Parallele Gerade	g ∥ h		Gleichschenkliges Dreieck	α = β a = b γ = 180°-2α	
Mittel-senkrechte	$\overline{AP} = \overline{BP}$		Tales-Satz	γ = 90°	
Winkel-halbierende	d = e		Peripheriewinkel Zentriwinkel Sehnen-Tangenten winkel	α = α‘ β = 2α α = γ	
Nebenwinkel	α+β = 180°				
Achsen-symmetrie	d = d‘		Drehsymmetrie – Punktspiegelung	d = d‘	
Fläche Dreieck	$A = \frac{c * h_c}{2}$				
Heron	$A = \sqrt{s * (s-a)(s-b)(s-c)}$		$s = \frac{a+b+c}{2}$		

1.2 Vierecke

Quadrat	α = β = γ = δ = 90° a = b = c = d	$A = a^2$ U = 4a $e = f = \sqrt{2} * a$ $e \perp f$ e und f halbieren einander	
Rechteck	α = β = γ = δ = 90° a = c b = d	A = a * b U = 2(a + b) e = f e und f halbieren einander	
Raute (Rhombus)	α = γ β = δ a = b = c = d	$A = \frac{e * f}{2}$ U = 4a $e \perp f$ e und f halbieren einander	
Parallelogramm	$a \parallel c$ $b \parallel d$ a = c b = d α = γ β = δ	$A = a*h_a = b * h^b$ U = 2(a + b) e und f halbieren einander α + δ = 180° β + γ = 180°	
Drachenviereck	a = d b = c	$A = \frac{e * f}{2}$ U = 2(a + b) $e \perp f$ eine Diagonale wird halbiert	
Trapez	α + δ = 180° β + γ = 180°	$A = \frac{a+c}{2} *h = m * h$ U = a + b + c + d	

1.3 Rechtwinklige Dreiecke

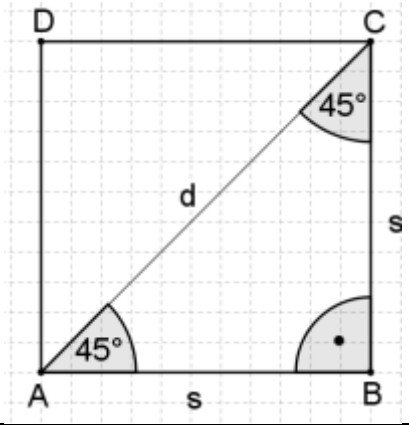


a, b = Katheten
c = Hypotenuse
h = Höhe
p, q = Hypotenusenabschnitte

Pythagoras	$c^2 = a^2 + b^2$
Höhensatz	$h^2 = p * q$
Kathetensatz	$a^2 = p * c \qquad b^2 = p * c$

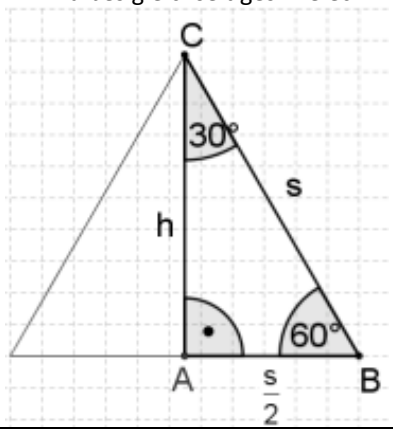
1.4 Spezielle rechtwinklige Dreiecke

Gleichschenklig rechtwinklige Dreiecke
→Halbes Quadrat



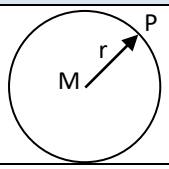
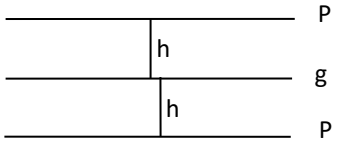
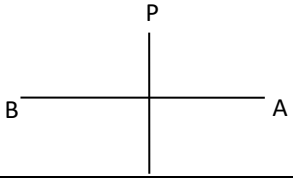
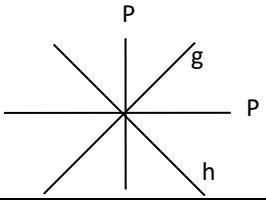
d = $\sqrt{2} * s$ s= $\frac{\sqrt{2}*d}{2}$

90°-60°-30°-Dreieck
→Halbes gleichseitiges Dreieck

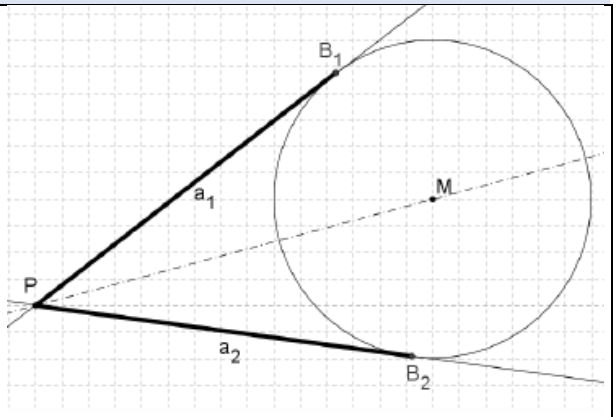


h = $\frac{\sqrt{3}*s}{2}$ s= $\frac{2*\sqrt{3}*h}{3}$

1.5 Dreieckskonstruktionen

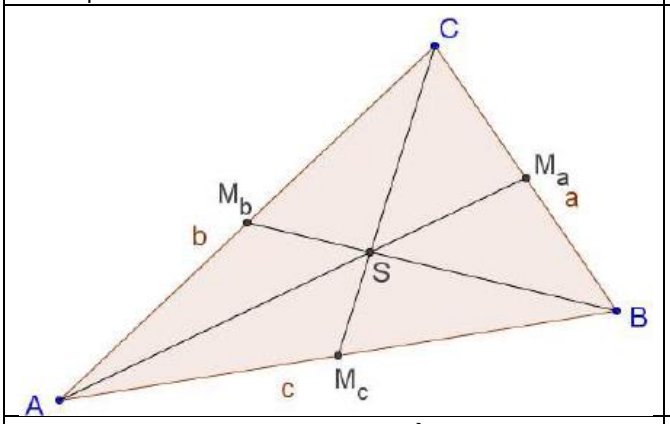
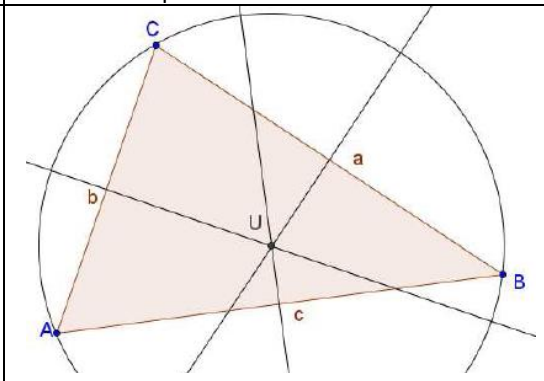
Kreis	
Parallelstreifen	
Mittelsenkrechte	
Winkelhalbierende w	

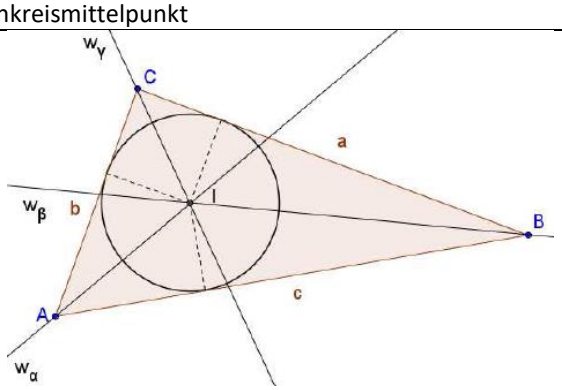
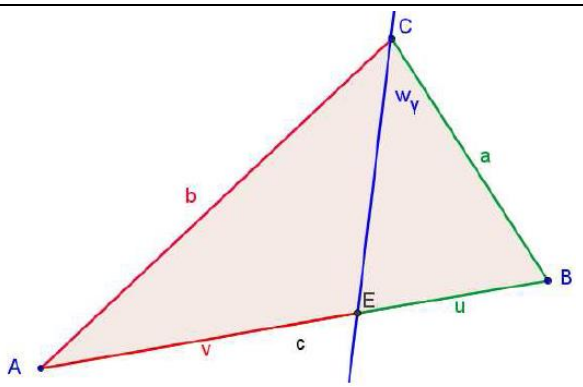
1.6 Tangentenabschnitte



$a_1 = a_2$

1.7 Dreiecksstücke

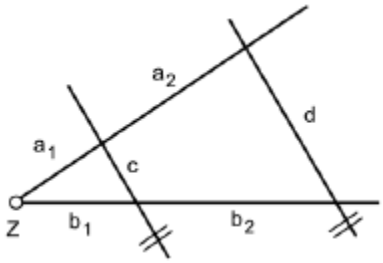
Schwerpunkt	Umkreismittelpunkt
	
Seitenhalbierende →2:1	Mittelsenkrechten / Seitenhalbierende

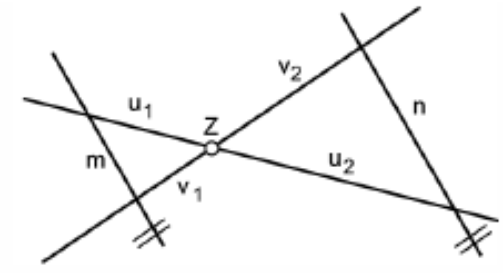
Inkreismittelpunkt	Winkelhalbierende
	
Winkelhalbierenden	$\frac{u}{v} = \frac{a}{b}$

1.8 Ähnlichkeit

Definition	Stimmen zwei Winkel überein, spricht man von ähnlich	
Seiten	$k = \frac{a'}{a} = \frac{h'}{h} = \frac{w'}{w} = \frac{R'}{R} = \frac{U'}{U}$	w = Winkelhalbierende R = Umkreisradius U = Umfang
Flächen	$k^2 = \frac{A_{A'B'C'}}{A_{ABC}}$	

1.9 Strahlensätze





Erster Strahlensatz			Zweiter Strahlensatz		
$\frac{a_1}{a_2} = \frac{b_1}{b_2}$	$\frac{a_1}{a_1 + a_2} = \frac{b_1}{b_1 + b_2}$	$\frac{u_1}{u_2} = \frac{v_1}{v_2}$	$\frac{c}{d} = \frac{a_1}{a_1 + a_2}$	$\frac{c}{d} = \frac{b_1}{b_1 + b_2}$	$\frac{m}{n} = \frac{u_1}{u_2}$