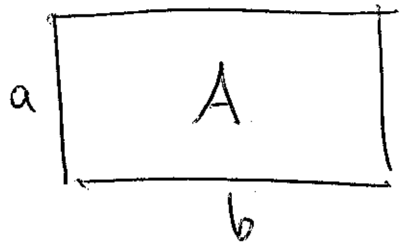
~~Fläche und Volumen~~ Geometrie

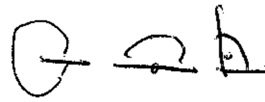
Rechteck



A Flächeninhalt

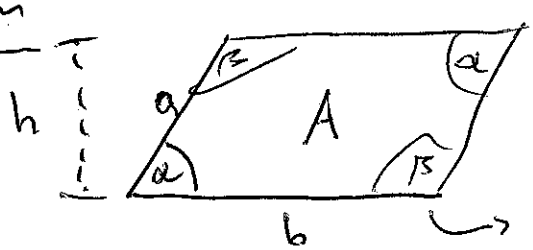
a, b Seitenlängen

$$A = a \cdot b$$

Winkel: 

Bogenmaß, Gradmaß

Parallelogramm

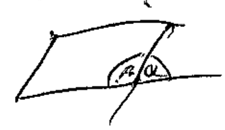


h Höhe

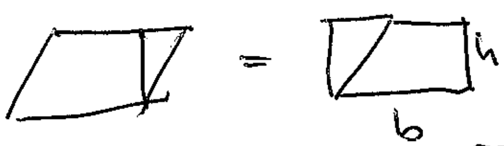
→ Grundseite

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

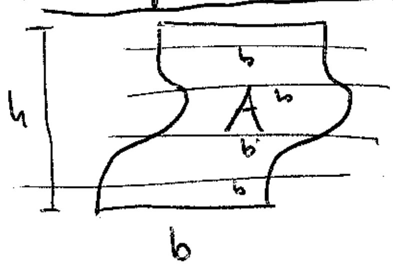
$$\boxed{\alpha + \beta = 180° = \pi}$$



denn:



~~Allgemeiner~~: Prinzip von Cavalieri

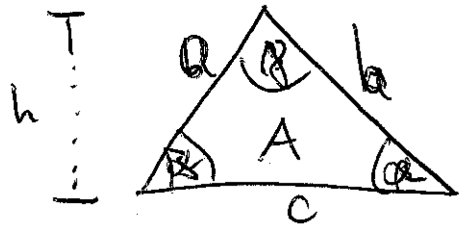


$$A = b \cdot h$$

alle Querschnitte haben Länge b.

denn:

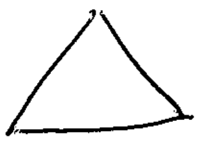
Dreieck



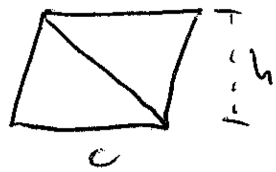
$$A = \frac{c \cdot h}{2} = \frac{\text{Grundseite} \cdot \text{Höhe}}{2}$$

$$h = b \cdot \sin\alpha$$
$$= a \cdot \sin\beta$$

denn:

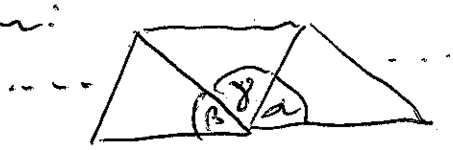


$= \frac{1}{2} \cdot$



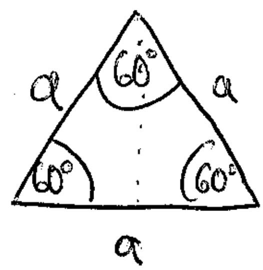
Winkelsumme: $\alpha + \beta + \gamma = 180° = \pi$

denn:



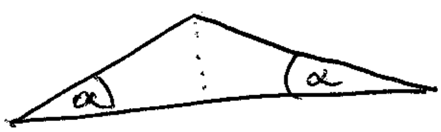
speziell Dreiecke:

gleichseitig $a = b = c$



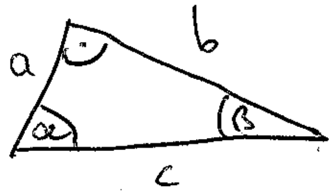
$$A = \frac{a^2 \sin 60°}{2} = \frac{\sqrt{3}}{4} a^2$$

gleichschenklig $\alpha = \beta$



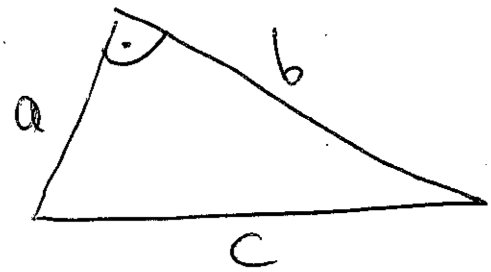
rechtwinklig $\gamma = 90°$

(also $\alpha + \beta = 90°$)



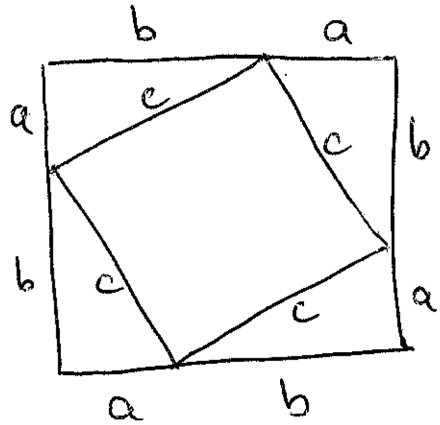
$$A = \frac{ab}{2}$$

Satz des Pythagoras



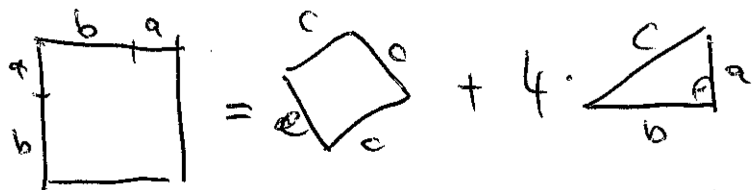
$$a^2 + b^2 = c^2$$

denn:



~~Fläche großer Quadrat = Fläche~~

$\Rightarrow$

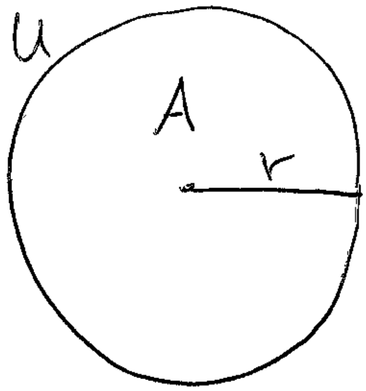


$$(a+b)^2 = c^2 + 4 \cdot \frac{ab}{2} \qquad | 2ab$$

$$\overset{\shortparallel}{a^2+2ab+b^2}$$

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

Kreis



r Radius

U Umfang

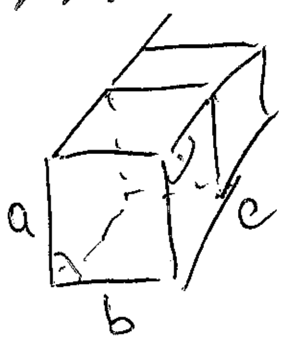
$U = 2\pi r$

$A = \pi r^2$

$\pi = 3{,}14159\ldots$ Kreiszahl

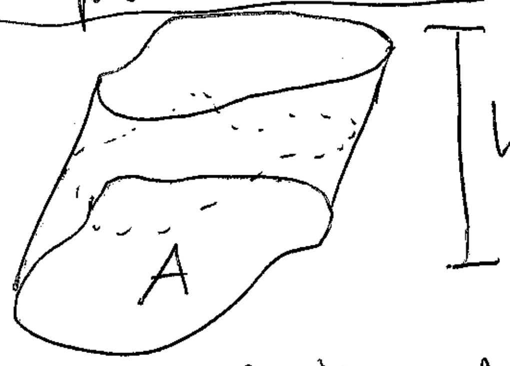
~~Würfel~~ Quader

V Volumen



$V = a\, b\, c$

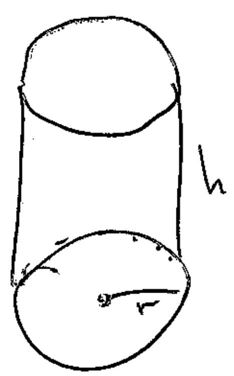
Prinzip von ~~Archi~~ Cavalieri



$V = A \cdot h$

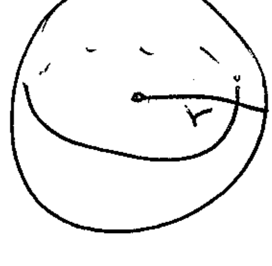
alle Querschnitte sind gleich

Zylinder



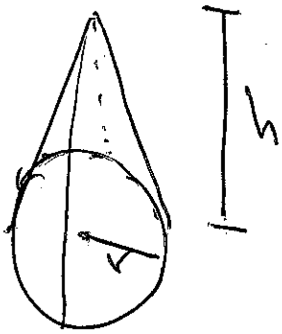
$V = \pi r^2 h$

Kugel



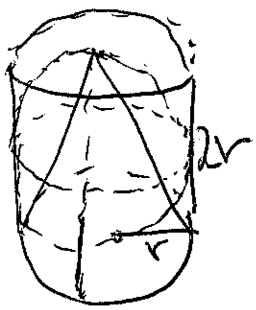
$V = \frac{4}{3}\pi r^3$

Kegel



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

Merkregel



$$V_{Zylinder} : V_{Kugel} : V_{Kegel} = 3 : 2 : 1$$