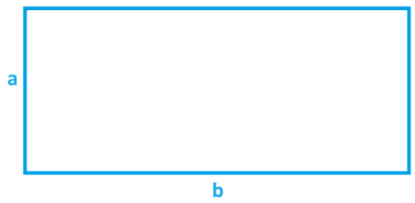
Umfang und Fläche gleich

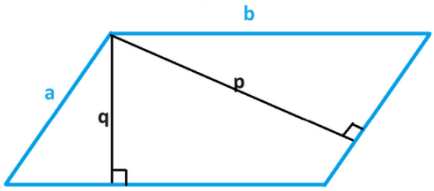
Rechteck: $\frac{1}{a}+\frac{1}{b}=\frac{1}{2}$



A = ab = U = 2(a+b) => $\frac{1}{ab}=\frac{1}{2(a+b)}$

=> $\frac{a+b}{ab}=\frac{1}{2}$ => $\frac{1}{b}+\frac{1}{a}=\frac{1}{2}$

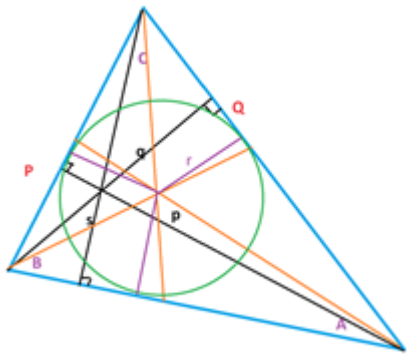
Parallelogramm: $\frac{q}{2a}=\frac{p}{2b}=\frac{1}{a}+\frac{1}{b}$



A = ap = bq = U = 2(a+b) => $\frac{q}{a}=\frac{p}{b}, \frac{ap}{2}=\frac{bq}{2}=a+b \mid : ab$

=> $\frac{p}{2b}=\frac{q}{2a}=\frac{a+b}{ab}=\frac{1}{b}+\frac{1}{a}$

Dreieck: $\frac{1}{p}+\frac{1}{q}+\frac{1}{s}=\frac{1}{r}$



a,b,c … Seiten des Dreiecks

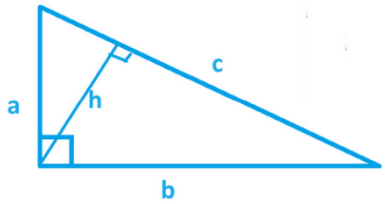
p,q,s … Höhen auf die Seiten

r … Inkreisradius

Fl = $\frac{1}{2}(a+b+c)r=\frac{1}{2}ap=\frac{1}{2}bq=\frac{1}{2}cs \mid :$ rap = rbq = rcs

=>$\frac{1}{p}+\frac{1}{q}+\frac{1}{s}=\frac{1}{r}$

Rechtwinkeliges Dreieck: $\frac{1}{a}+\frac{1}{b}+\frac{1}{h}=\frac{1}{2}$

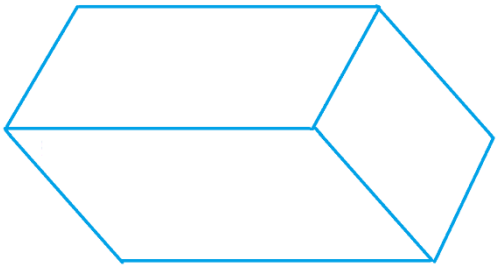


A= ab/2 =c h/2 = U = a+b+c |: ab

=> $\frac{1}{2}=\frac{1}{b}+\frac{1}{a}+\frac{c}{ab}$ mit c = $\frac{ab}{h}$

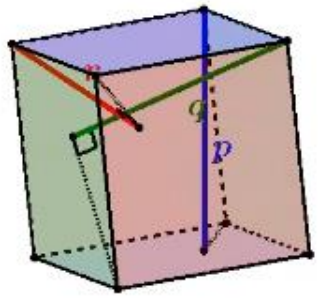
Oberfläche und Volumen gleich

Quader: $\frac{1}{a}+\frac{1}{b}+\frac{1}{c}=\frac{1}{2}$



V=abc = O = 2(ab+bc+ac) |:abc => $\frac{1}{a}+\frac{1}{b}+\frac{1}{c}=\frac{1}{2}$

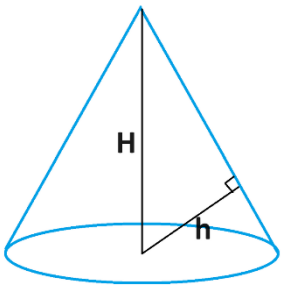
Parallelepiped: $\frac{1}{p}+\frac{1}{q}+\frac{1}{r}=\frac{1}{2}$



V = pA1 = qA2 = rA3 = O = 2(A1+A2+A3) = 2($\frac{V}{p}+\frac{V}{q}+\frac{V}{r}$)

=> $\frac{1}{p}+\frac{1}{q}+\frac{1}{r}=\frac{1}{2}$

Kreiskegel: $\frac{1}{H}+\frac{1}{h}=\frac{1}{3}$



$$A=\pi r(\sqrt{r^2+H^2}+\pi r^2$$

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

$$V=A$$

$$\Rightarrow \frac{rH}{3}=\sqrt{r^2+H^2}+r$$

$$\Rightarrow \frac{1}{3}=\sqrt{\frac{1}{H^2}+\frac{1}{r^2}+\frac{1}{H}}$$

$$s^2=H^2+r^2$$

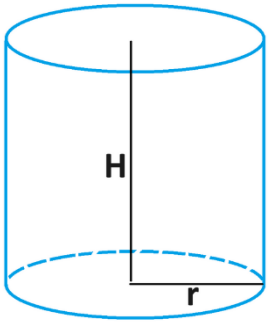
$$\frac{h}{r}=\frac{H}{s}\Rightarrow hs=rH$$

$$\frac{1}{h^2}=\frac{1}{r^2}+\frac{1}{H^2}\Rightarrow \frac{1}{r^2}=\frac{1}{h^2}-\frac{1}{H^2}$$

$$\Rightarrow \frac{1}{3}=\sqrt{\frac{1}{H^2}+\frac{1}{h^2}-\frac{1}{H^2}+\frac{1}{H}}$$

$$=\frac{1}{h}+\frac{1}{H}$$

Kreiszylinder: $\frac{1}{H}+\frac{1}{r}=\frac{1}{2}$



V = $r^2\pi$H = O = $2r^2\pi$ + 2rπH |: rπ =>

rH = 2r+2H => $\frac{1}{2}=\frac{1}{H}+\frac{1}{r}$