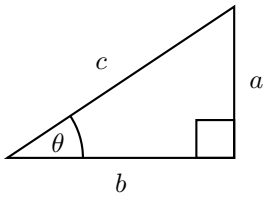
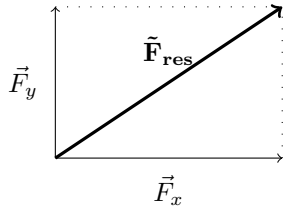
TRIGONOMETRI

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



$$\sin\theta = \frac{a}{c}$$
$$\cos\theta = \frac{b}{c}$$
$$\tan\theta = \frac{a}{b}$$

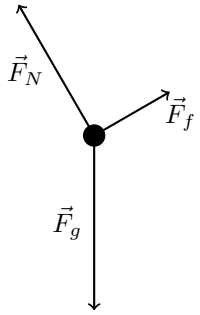
VEKTORER



$$\tilde{\mathbf{F}}_{\mathbf{res}} = \vec{F}_x + \vec{F}_y$$
$$F_{res}^2 = F_x^2 + F_y^2$$
$$\Rightarrow F_{res} = \sqrt{F_x^2 + F_y^2}$$

Summan av krafter i jämviktat system lika med noll (se kraftdiagram till höger)

$\vec{F}_N + \vec{F}_f + \vec{F}_g = 0$



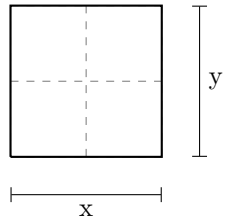
POTENSER

$a^x \cdot a^y = a^{x+y}$	$2^3 \cdot 2^2 = 2^{(3+2)}$
$\frac{a^x}{a^y} = a^{x-y}$	$\frac{2^3}{2^2} = 2^{(3-2)}$
$(a^x)^y = a^{xy}$	$(2^3)^2 = 2^{(3\cdot 2)}$
$a^{-x} = \frac{1}{a^x}$	$2^{-3} = \frac{1}{2^3}$
$a^x \cdot b^x = (a \cdot b)^x$	$2^3 \cdot 5^3 = (2 \cdot 5)^3$
$\frac{a^x}{b^x} = \left(\frac{a}{b}\right)^x$	$\frac{2^2}{5^2} = \left(\frac{2}{5}\right)^2$
$a^{\frac{1}{n}} = \sqrt[n]{a}$	$8^{\frac{1}{3}} = \sqrt[3]{8}$
$a^0 = 1$	$2^0 = 1$

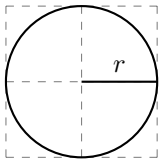
10^{-12}	0,000000000001	p	pico-
10^{-9}	0,000000001	n	nano-
10^{-6}	0,000001	µ	micro-
10^{-3}	0,001	m	milli-
10^{-2}	0,01	c	centi-
10^{-1}	0,1	d	deci-
10^{0}	1,		
10^{2}	100,	h	hekto-
10^{3}	1000,	k	kilo-
10^{6}	1000000,	M	mega-
10^{9}	1000000000,	G	giga-
10^{12}	1000000000000,	T	tera-

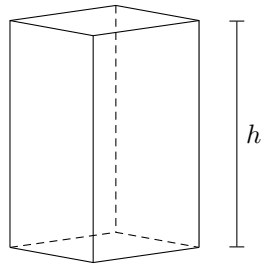
AREA, VOLYM & DENSITET

$A_{kvadrat} = x \cdot y$



$A_{cirkel} = \pi \cdot r^2$

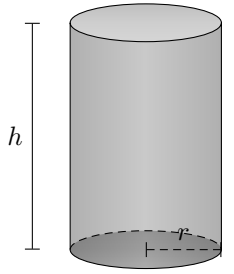




$V = A \cdot h$

$= 4\,\mathrm{m}^2 \cdot 6\,\mathrm{m}$

$= 24\,\mathrm{m}^3$



$V = A \cdot h$

Densitet

$$\rho = \frac{m}{V}$$

$$\rho_{vatten} = 1000\,\frac{\mathrm{kg}}{\mathrm{m}^3} = \frac{1000\,\mathrm{kg}}{1\,\mathrm{m}^3} \qquad \text{(vattnets densitet)}$$
$$= 1{,}00\,\frac{\mathrm{kg}}{\mathrm{L}}$$

Omräkning kubikmeter till liter

$$
\begin{aligned}
1\,\mathrm{m}^3 &= (1\,\mathrm{m})^3 \cdot 1 \\
&= (1\,\mathrm{m})^3 \cdot \left(\frac{10\,\mathrm{dm}}{1\,\mathrm{m}}\right)^3 \\
&= 1\,\cancel{\mathrm{m}^3} \cdot \frac{10^3\,\mathrm{dm}^3}{1\,\cancel{\mathrm{m}^3}} \\
&= 10^3\,\mathrm{dm}^3 \\
&= 10^3\,\mathrm{l}
\end{aligned}
$$

RÖRELSE

$v = \frac{\Delta s}{\Delta t}$ $\quad 1\,\frac{\mathrm{m}}{\mathrm{s}} = \frac{1\,\mathrm{m}}{1\,\mathrm{s}}$ (hastighet)

$a = \frac{\Delta v}{\Delta t}$ $\quad 1\,\frac{\mathrm{m}}{\mathrm{s}^2} = \frac{\frac{1\,\mathrm{m}}{1\,\mathrm{s}}}{1\,\mathrm{s}}$ (acceleration)

$F = m \cdot a$ $\quad 1\,\mathrm{N} = 1\,\mathrm{kg} \cdot 1\,\frac{\mathrm{m}}{\mathrm{s}^2}$ (kraft)

$W = F \cdot \Delta s$ $\quad 1\,\mathrm{J} = 1\,\mathrm{N} \cdot 1\,\mathrm{m}$ (arbete: Joule)

$= E$ $\quad 1\,\mathrm{J}$ (energi: Joule)

$P = \frac{\Delta W}{\Delta t}$ $\quad 1\,\mathrm{W} = \frac{1\,\mathrm{J}}{1\,\mathrm{s}}$ (effekt: Watt)

$p = m \cdot v$ $\quad 1\,\frac{\mathrm{kg\,m}}{\mathrm{s}} = 1\,\mathrm{kg} \cdot 1\,\frac{\mathrm{m}}{\mathrm{s}}$

(rörelsemängd)

$E_{kinetisk} = \frac{1}{2} \cdot m \cdot v^2$ $\quad 0{,}5\,\mathrm{J} = \frac{1}{2} \cdot 1\,\mathrm{kg} \cdot \left(1\,\frac{\mathrm{m}}{\mathrm{s}}\right)^2$

(rörelseenergi)

$E_{potential} = m \cdot g \cdot h$ $\quad 10\,\mathrm{J} = 1\,\mathrm{kg} \cdot 10\,\frac{\mathrm{m}}{\mathrm{s}^2} \cdot 1\,\mathrm{m}$

(lägesenergi)

TRYCK & VÄRME

$p = \frac{F}{A}$ $\quad 1\,\mathrm{Pa} = \frac{1\,\mathrm{N}}{1\,\mathrm{m}^2}$ (tryck: Pascal)

$p = \rho \cdot g \cdot h$ $\quad 10\,000\,\mathrm{Pa} = 1000\,\frac{\mathrm{kg}}{\mathrm{m}^3} \cdot 10\,\frac{\mathrm{m}}{\mathrm{s}^2} \cdot 1\,\mathrm{m}$

(vätsketryck)

$F = \rho \cdot g \cdot V$ $\quad 10\,000\,\mathrm{N} = 1000\,\frac{\mathrm{kg}}{\mathrm{m}^3} \cdot 10\,\frac{\mathrm{m}}{\mathrm{s}^2} \cdot 1\,\mathrm{m}^3$

(Arkimedes princip: lyftkraft i Newton)

$p \cdot V = n \cdot R \cdot T$ (Allmänna gaslagen)

$2 \cdot 10^5\,\mathrm{Pa} \cdot 1\,\mathrm{m}^3 = 24{,}0\,\mathrm{mol} \cdot 8{,}314\,\frac{\mathrm{Pa\,m}^3}{\mathrm{mol\,K}} \cdot 1002\,\mathrm{K}$

$E = c \cdot m \cdot T$ $\quad 800\,\mathrm{kJ} = 4\,\frac{\mathrm{kJ}}{\mathrm{kg\,K}} \cdot 4\,\mathrm{kg} \cdot 50\,\mathrm{K}$

(c = specifik värmekapacitet)

$\Delta E = c \cdot m \cdot \Delta T$ $\quad 1000\,\mathrm{J} = 1000\,\frac{\mathrm{J}}{\mathrm{kg\,K}} \cdot 1\,\mathrm{kg} \cdot 1\,\mathrm{K}$

(c = specifik värmekapacitet)

$\Delta E = l_s \cdot m$ $\quad 1000\,\mathrm{J} = 1000\,\frac{\mathrm{J}}{\mathrm{kg}} \cdot 1\,\mathrm{kg}$

(smältvärme)

$\Delta E = l_a \cdot m$ $\quad 1000\,\mathrm{J} = 1000\,\frac{\mathrm{J}}{\mathrm{kg}} \cdot 1\,\mathrm{kg}$

(ångbildningsvärme)

ELEKTRICITET

$F = k_e \cdot \frac{Q_1 \cdot Q_2}{r^2}$

(Coulombs lag, där $k_e = 8{,}99 \cdot 10^9\,\frac{\mathrm{N\,m}^2}{\mathrm{C}^2}$)

$I = \frac{Q}{t}$ $\quad 1\,\mathrm{A} = \frac{1\,\mathrm{C}}{1\,\mathrm{s}}$ (ström: Ampere)

$U = \frac{E}{Q}$ $\quad 1\,\mathrm{V} = \frac{1\,\mathrm{J}}{1\,\mathrm{C}}$ (spänning: Volt)

$U = R \cdot I$ $\quad 1\,\mathrm{V} = 1\,\Omega \cdot 1\,\mathrm{A}$

(Ohms lag, där R=Resistans=motstånd: Ohm)

$P = U \cdot I$ $\quad 1\,\mathrm{W} = 1\,\mathrm{V} \cdot 1\,\mathrm{A}$ (Effekt: Watt)

$= R \cdot I^2$ $\quad = 1\,\Omega \cdot 1\,\mathrm{A}^2$

$= R \cdot I^2$ $\quad 1\,\mathrm{W} = 1\,\Omega \cdot (1\,\mathrm{A})^2)$

$R_{tot} = R_1 + R_2$ (för två seriekopplade motstånd)

$\frac{1}{R_{tot}} = \frac{1}{R_1} + \frac{1}{R_2}$

(för två parallellkopplade motstånd)