

Formler till nationellt prov i matematik, kurs 2

Algebra

Regler

$$(a + b)^2 = a^2 + 2ab + b^2$$

$$(a - b)^2 = a^2 - 2ab + b^2$$

$$(a + b)(a - b) = a^2 - b^2$$

Andragradsekvationer

$$x^2 + px + q = 0$$

$$ax^2 + bx + c = 0$$

$$x = -\frac{p}{2} \pm \sqrt{\left(\frac{p}{2}\right)^2 - q}$$

$$x = -\frac{b}{2a} \pm \frac{\sqrt{b^2 - 4ac}}{2a}$$

Aritmetik

Prefix

T	G	M	k	h	d	c	m	μ	n	p
tera	giga	mega	kilo	hekto	deci	centi	milli	mikro	nano	piko
10^{12}	10^9	10^6	10^3	10^2	10^{-1}	10^{-2}	10^{-3}	10^{-6}	10^{-9}	10^{-12}

Potenser

$$a^x a^y = a^{x+y}$$

$$\frac{a^x}{a^y} = a^{x-y}$$

$$(a^x)^y = a^{xy}$$

$$a^{-x} = \frac{1}{a^x}$$

$$a^x b^x = (ab)^x$$

$$\frac{a^x}{b^x} = \left(\frac{a}{b}\right)^x$$

$$\frac{1}{a^n} = \sqrt[n]{a}$$

$$a^0 = 1$$

Logaritmer

$$y = 10^x \Leftrightarrow x = \lg y$$

$$\lg x + \lg y = \lg xy$$

$$\lg x - \lg y = \lg \frac{x}{y}$$

$$\lg x^p = p \cdot \lg x$$

Funktioner

Räta linjen

$$y = kx + m \quad k = \frac{y_2 - y_1}{x_2 - x_1}$$

$ax + by + c = 0$, där inte både a och b är noll

Potensfunktioner

$$y = C \cdot x^a$$

Andragsgradsfunktioner

$$y = ax^2 + bx + c \quad a \neq 0$$

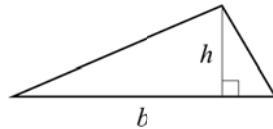
Exponentialfunktioner

$$y = C \cdot a^x \quad a > 0 \text{ och } a \neq 1$$

Geometri

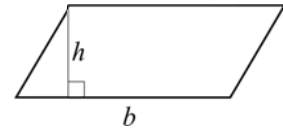
Triangel

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



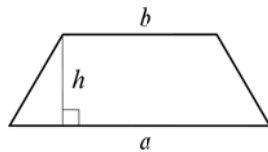
Parallelogram

$$A = bh$$



Parallelltrapets

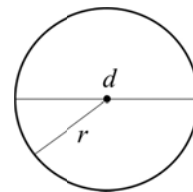
$$A = \frac{h(a+b)}{2}$$



Cirkel

$$A = \pi r^2 = \frac{\pi d^2}{4}$$

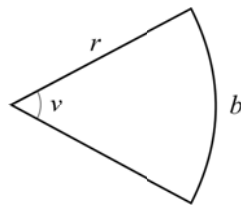
$$O = 2\pi r = \pi d$$



Cirkelsektor

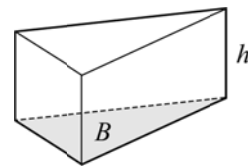
$$b = \frac{v}{360^\circ} \cdot 2\pi r$$

$$A = \frac{v}{360^\circ} \cdot \pi r^2 = \frac{br}{2}$$



Prisma

$$V = Bh$$

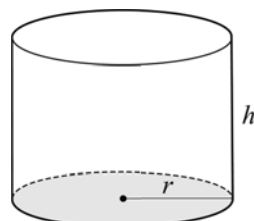


Cylinder

$$V = \pi r^2 h$$

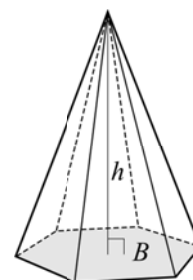
Mantelarea

$$A = 2\pi r h$$



Pyramid

$$V = \frac{Bh}{3}$$

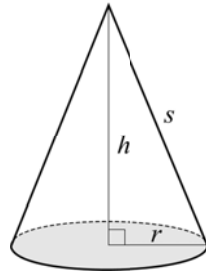


Kon

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

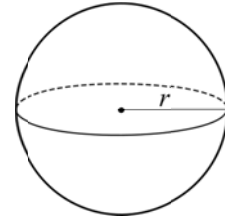
Mantelarea

$$A = \pi r s$$

**Klot**

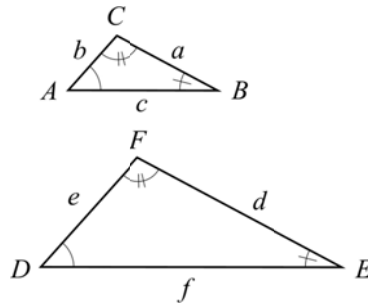
$$V = \frac{4\pi r^3}{3}$$

$$A = 4\pi r^2$$

**Likformighet**

Triangelarna ABC och DEF är likformiga.

$$\frac{a}{d} = \frac{b}{e} = \frac{c}{f}$$

**Skala**

$$\text{Areaskalan} = (\text{Längdskalan})^2$$

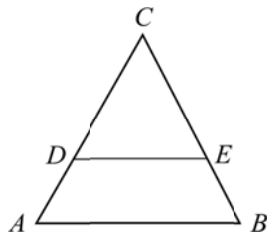
$$\text{Volymskalan} = (\text{Längdskalan})^3$$

Topptriangel- och transversalsatsen

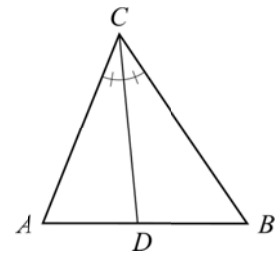
Om DE är parallell med AB gäller

$$\frac{DE}{AB} = \frac{CD}{AC} = \frac{CE}{BC} \text{ och}$$

$$\frac{CD}{AD} = \frac{CE}{BE}$$

**Bisektrissatsen**

$$\frac{AD}{BD} = \frac{AC}{BC}$$

**Vinklar**

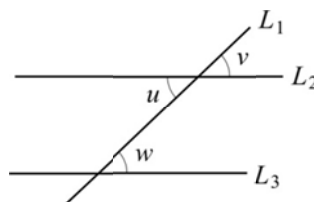
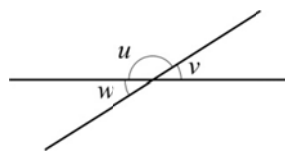
$$u + v = 180^\circ \quad \text{Sidovinklar}$$

$$w = v \quad \text{Vertikalvinklar}$$

L_1 skär två parallella linjer L_2 och L_3

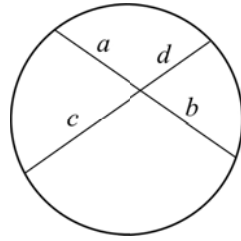
$$v = w \quad \text{Likbelägna vinklar}$$

$$u = w \quad \text{Alternativvinklar}$$

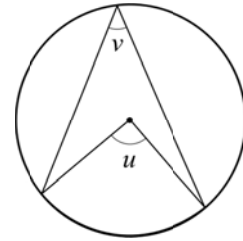


Kordasatsen

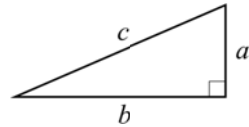
$$ab = cd$$

**Randvinkelsatsen**

$$u = 2v$$

**Pythagoras sats**

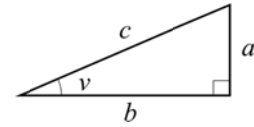
$$a^2 + b^2 = c^2$$

**Trigonometri**

$$\sin v = \frac{a}{c}$$

$$\cos v = \frac{b}{c}$$

$$\tan v = \frac{a}{b}$$

**Avståndsformeln**

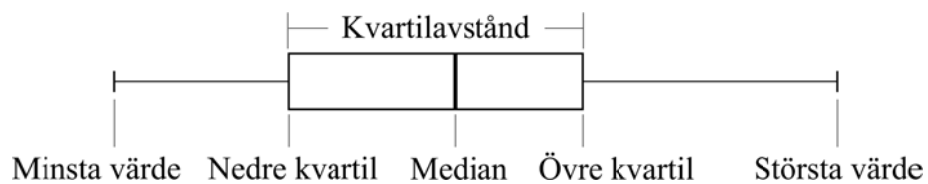
$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

Mittpunktsformeln

$$x_m = \frac{x_1 + x_2}{2} \quad \text{och} \quad y_m = \frac{y_1 + y_2}{2}$$

Statistik och sannolikhet**Standardavvikelse för ett stickprov**

$$s = \sqrt{\frac{(x_1 - \bar{x})^2 + (x_2 - \bar{x})^2 + \dots + (x_n - \bar{x})^2}{n-1}}$$

Lådagram**Normalfördelning**