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Støddfrøði C Formlasavn



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Formlasavnið er gjört sambært galddandi námsætlan og er góðkent til at brúka til próvtøkuna í Støddførði C á miðnámi. Formlasavnið er at finna á heimasíðunum namsaetlanir.fo og provstovan.fo

Prosent- og renturokning

Byrjanarvirði B (1) $S = B \cdot (1 + r)$
 Endavirði S

Vakstrartali r (2) $r = \frac{S}{B} - 1$

Kapitalframskriving

Byrjanarkapitalur K_0 (3) $K = K_0 \cdot (1 + r)^n$
 Renta r pr. termin
 Kapitalur K eftir n terminir

Annuitetsuppsparing (4) $A = b \cdot \frac{(1 + r)^n - 1}{r}$

Terminsinngjald b
 Rentufótur r
 Tal av inngjöldum n
 Kapitalur A eftir síðsta
 inngjald

Annuitetslán (5) $y = G \cdot \frac{r}{1 - (1 + r)^{-n}}$

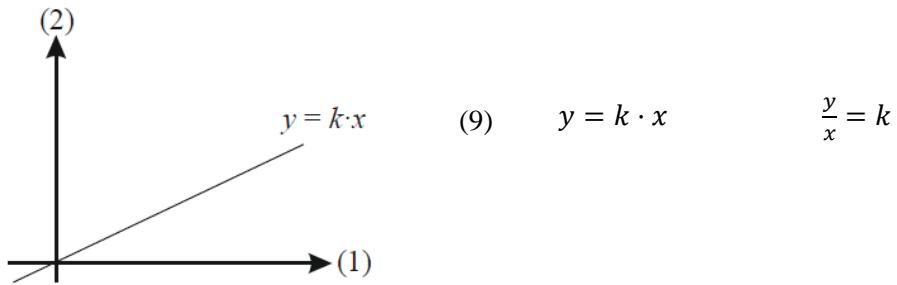
Upprunalán G
 Rentufótur r
 Tal av terminsgjöldum n
 Terminsgjöld y

Vigað miðal
 av x_1, x_2, \dots, x_n við (6) $x = p_1 \cdot x_1 + p_2 \cdot x_2 + \dots + p_n \cdot x_n$
 vektunum p_1, p_2, \dots, p_n

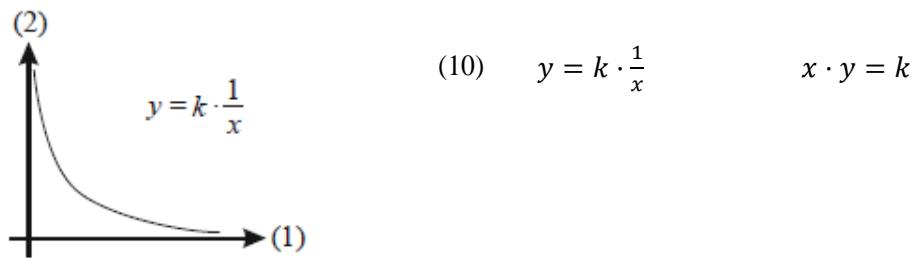
Miðalrenta r_m (7) $1 + r_m = \sqrt[n]{(1 + r_1) \cdot (1 + r_2) \cdot \dots \cdot (1 + r_n)}$

Àrlig effektiv renta r_e (8) $r_e = (1 + r)^n - 1$
 við termsinsrentuni r
 og n terminum um árið.

Lutfall



x og y eru í beinum lutfalli
Lutfallstal k



x og y eru í øvutum lutfalli

Brotreglur

$$(11) \quad a \cdot \frac{b}{c} = \frac{a \cdot b}{c}$$

$$(12) \quad \frac{a}{b} = \frac{a \cdot c}{b \cdot c}$$

$$(13) \quad \frac{\frac{a}{b}}{c} = \frac{a}{b \cdot c}$$

$$(14) \quad \frac{\frac{a}{b}}{\frac{c}{d}} = \frac{a \cdot d}{b \cdot c}$$

$$(15) \quad \frac{a}{b} \cdot \frac{c}{d} = \frac{a \cdot c}{b \cdot d}$$

Kvadratsetningar

$$(16) \quad (a + b)^2 = a^2 + b^2 + 2 \cdot a \cdot b$$

$$(17) \quad (a - b)^2 = a^2 + b^2 - 2 \cdot a \cdot b$$

$$(18) \quad (a + b) \cdot (a - b) = a^2 - b^2$$

Potensroknireglur

$$(19) \quad a^r \cdot a^s = a^{r+s}$$

$$(20) \quad \frac{a^r}{a^s} = a^{r-s}$$

$$(21) \quad (a^r)^s = a^{r \cdot s}$$

$$(22) \quad (a \cdot b)^r = a^r \cdot b^r$$

$$(23) \quad \left(\frac{a}{b}\right)^r = \frac{a^r}{b^r}$$

$$(24) \quad a^0 = 1$$

$$(25) \quad a^{-r} = \frac{1}{a^r}$$

$$(26) \quad a^{-1} = \frac{1}{a}$$

$$(27) \quad \sqrt[r]{a} = a^{1/r}$$

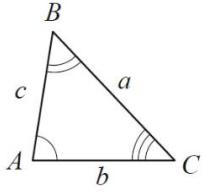
$$(28) \quad \sqrt[s]{a^r} = a^{r/s}$$

$$(29) \quad \sqrt{a \cdot b} = \sqrt{a} \cdot \sqrt{b}$$

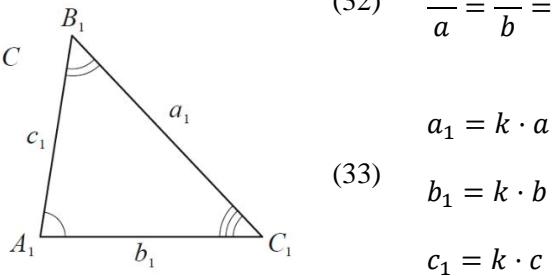
$$(30) \quad \sqrt{\frac{a}{b}} = \frac{\sqrt{a}}{\sqrt{b}}$$

$$(31) \quad \sqrt{a} = a^{1/2}$$

Einsvinklaðir tríkantar

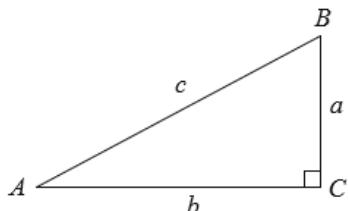


$$(32) \quad \frac{a_1}{a} = \frac{b_1}{b} = \frac{c_1}{c} = k$$



$$(33) \quad \begin{aligned} a_1 &= k \cdot a \\ b_1 &= k \cdot b \\ c_1 &= k \cdot c \end{aligned}$$

Rættvinklaður tríkantur



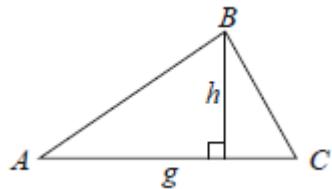
$$\text{Pythagoras setningur} \quad (34) \quad c^2 = a^2 + b^2$$

$$\text{Cosinus} \quad (35) \quad \cos(A) = \frac{b}{c}$$

$$\text{Sinus} \quad (36) \quad \sin(A) = \frac{a}{c}$$

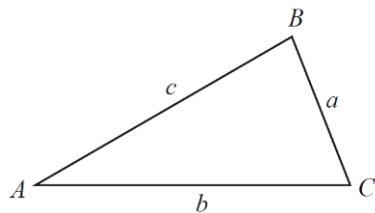
$$\text{Tangens} \quad (37) \quad \tan(A) = \frac{a}{b}$$

Tilvildarligur tríkantur



$$\text{Vinkulsummur hjá tríkantinum} \quad (38) \quad A + B + C = 180^\circ$$

$$\text{Víddin } T \text{ á tríkantinum} \quad (39) \quad T = \frac{1}{2} \cdot h \cdot g$$



$$\text{Cosinusrelatiónir} \quad (40) \quad c^2 = a^2 + b^2 - 2 \cdot a \cdot b \cdot \cos(C)$$

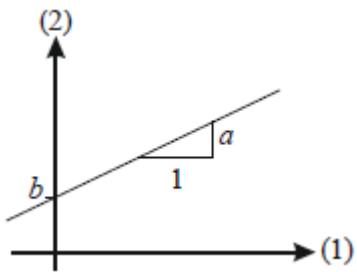
$$(41) \quad \cos(C) = \frac{a^2 + b^2 - c^2}{2 \cdot a \cdot b}$$

$$\text{Sinusrelatiónir} \quad (42) \quad \frac{a}{\sin(A)} = \frac{b}{\sin(B)} = \frac{c}{\sin(C)}$$

$$(43) \quad \frac{\sin(A)}{a} = \frac{\sin(B)}{b} = \frac{\sin(C)}{c}$$

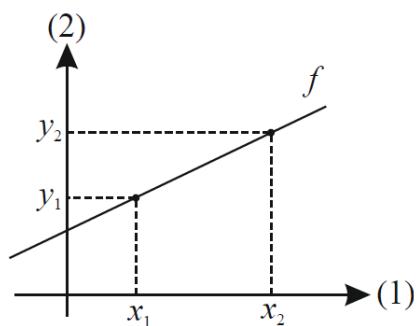
$$\text{Víddin } T \text{ á tríkantinum} \quad (44) \quad T = \frac{1}{2} \cdot a \cdot b \cdot \sin(C)$$

Linjurøtt funktión



Linjurøtt funktión f
Polynom á fyrsta stigi

$$(45) \quad f(x) = a \cdot x + b$$



Halltalið a út frá 2 punktum á
grafinum (x_1, y_1) og (x_2, y_2)

$$(46) \quad a = \frac{y_2 - y_1}{x_2 - x_1}$$

Skurður við y-ásin

$$(47) \quad b = y_1 - a \cdot x_1$$

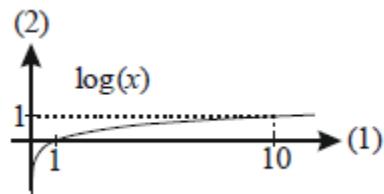
Logaritmufunktión

Logaritmufunktiónin við grundtalinum 10

$$(48) \quad f(x) = \log(x)$$

Grafurin fyri logaritmufunktiónin við grundtalinum 10

$$(49)$$



$$(50) \quad y = \log(x) \Leftrightarrow x = 10^y$$

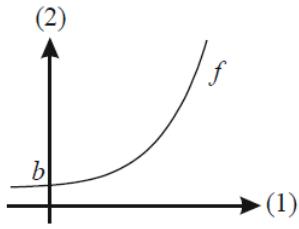
$$(51) \quad \log(10) = 1$$

$$(52) \quad \log(a \cdot b) = \log(a) + \log(b)$$

$$(53) \quad \log\left(\frac{a}{b}\right) = \log(a) - \log(b)$$

$$(54) \quad \log(a^r) = r \cdot \log(a)$$

Eksponentielt vaksandi funktión

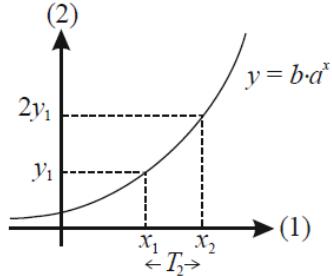


Grafurin fyri eina eksponentielt vaksandi funktión f

$$a > 1 \quad \text{vakstrartalið } r > 0 \quad (55) \quad f(x) = b \cdot a^x = b \cdot (1 + r)^x$$

$$\text{Framskrivingartalið } a \text{ út frá 2 punktum á grafinum } (x_1, y_1) \text{ og } (x_2, y_2) \quad (56) \quad a = \sqrt[x_2 - x_1]{\frac{y_2}{y_1}}$$

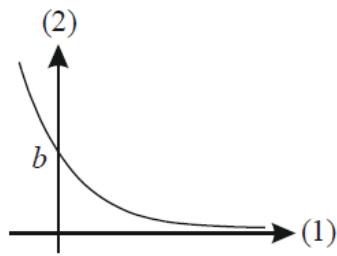
$$\text{Skurður við } y\text{-ásin} \quad (57) \quad b = \frac{y_1}{a^{x_1}}$$



$$\text{Tvífaldstalið } T_2 \quad (58) \quad T_2 = x_2 - x_1$$

$$(59) \quad T_2 = \frac{\log(2)}{\log(a)}$$

Eksponentielt minkandi funktión



Grafurin fyri eina eksponentielt
minkandi funktión f
 $0 < a < 1$
 vakstrartalið $r < 0$

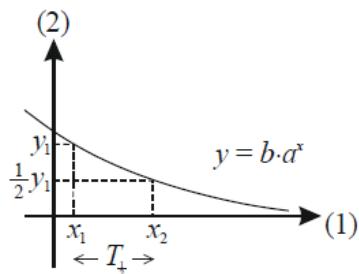
$$(60) \quad f(x) = b \cdot a^x \\ = b \cdot (1 + r)^x$$

Framskrivningartalið a
 út frá 2 punktum á grafinum
 (x_1, y_1) og (x_2, y_2)

$$(61) \quad a = \sqrt[x_2 - x_1]{\frac{y_2}{y_1}}$$

Skurður við y -ásin

$$(62) \quad b = \frac{y_1}{a^{x_1}}$$



Helvtartalið $T_{\frac{1}{2}}$

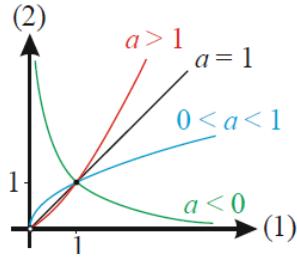
$$(63) \quad T_{\frac{1}{2}} = x_2 - x_1$$

$$(64) \quad T_{\frac{1}{2}} = \frac{\log(\frac{1}{2})}{\log(a)}$$

Potensfunktión

Potensfunktión

$$(65) \quad f(x) = b \cdot x^a$$



Grafar fyri $f(x) = x^a$

Talið a út frá tveimum punktum
á grafinum (x_1, y_1) og (x_2, y_2)

$$(66) \quad a = \frac{\log(y_2) - \log(y_1)}{\log(x_2) - \log(x_1)}$$

$$(67) \quad b = \frac{y_1}{x_1^a}$$

Prosent-prosent broyting

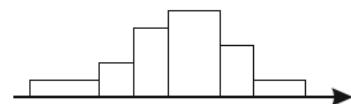
$$(68) \quad 1 + r_y = (1 + r_x)^a$$

Tá x verður faldað við talinum k ,
so faldast $f(x)$ við talinum k^a

$$(69) \quad f(k \cdot x) = k^a \cdot f(x)$$

Flokkað hagtöl

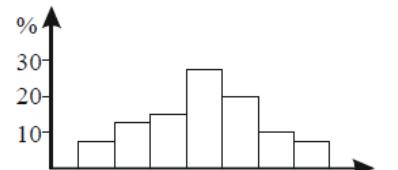
10%



Histogramm

(70)

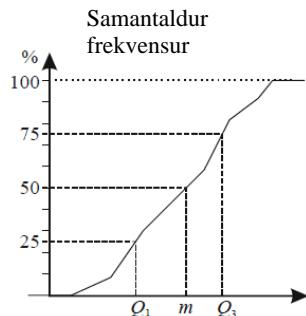
Víddin á einum blokki samsvarar frekvensin í intervallinum



Histogramm við eins intervallongdum

(71)

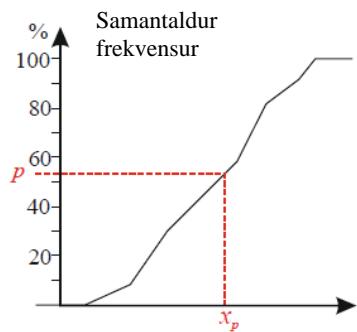
Hæddin á einum blokki samsvarar frekvensin í intervallinum



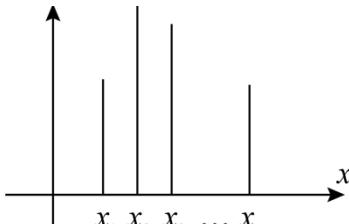
S-rás

(72)

Q_1 : niðasta fjóðringsmark, 25% -partmarkið
 m : medianur, 50% -partmarkið
 Q_3 : ovasta fjóðringsmark, 75% -partmarkið
 x_p : $p\%$ -partmarkið



Óflokkað hagtöl

Eygleiðingarmongd	(73)	$x_1, x_2, x_3, \dots, x_n$
Pinnamynd	(74)	Títtleiki/ frekvensur
		
Breidd	(75)	$\max - \min$ har \min er tann minsta eygleiðingin og \max er tann största.
Mesti	(76)	Tann/tær eygleiðing/ar, ið koma oftas fyri
Median m	(77)	Tað mittarsta eygleiðingarvirði um talið av eygleiðingum eru stök, annars talið mitt millum tvær tær mittarstu eygleiðingarnar.
Niðara fjórðingsmark Q_1	(78)	Medianurin fyri niðaru helvt av eygleiðingunum
Ovara fjórðingsmark Q_3	(79)	Medianurin fyri ovaru helvt av eygleiðingunum
Fjórðingsmarksbreidd	(80)	$Q_3 - Q_1$
Fjórðingsmørk	(81)	(Q_1, m, Q_3)
Víðkaði fjórðingsmørk	(82)	$(\min, Q_1, m, Q_3, \max)$

Miðaltalið fyrir eygleiðingar-mongdina x_1, x_2, \dots, x_n

$$(83) \quad \bar{x} = \frac{x_1 + x_2 + \dots + x_n}{n}$$

$$= \frac{1}{n} \sum_{i=1}^n x_i$$

Variansur fyrir eygleiðingar-mongdina x_1, x_2, \dots, x_n

$$(84) \quad Var(x) = \frac{1}{n} \sum_{i=1}^n (x_i - \bar{x})^2$$

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

Spjaðing fyrir eygleiðingar-mongdina x_1, x_2, \dots, x_n

$$(85) \quad \sigma = \sqrt{Var(x)}$$

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

Linjurøtt regresión

Talva við eygleiddum dátum

(86)

x	x_1	x_2	x_3	\dots	x_n
y	y_1	y_2	y_3	\dots	y_n

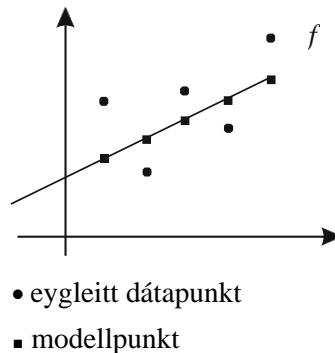
Regressíónslinja

(87)

Tann besta rætta linjan, grafur fyrir $f(x) = ax + b$

Punktpplot og tann besta rætta linjan

(88)



Residual

(89)

Munurin millum eygleitt y -virði og samsvarandi y -virði í modellinum

$$r_i = y_i - f(x_i)$$

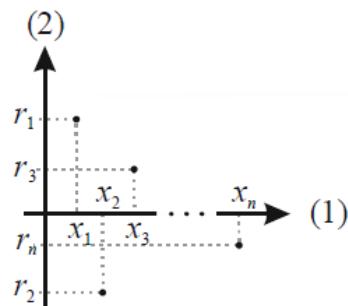
Residualtalva

(90)

x	x_1	x_2	x_3	\dots	x_n
Residual	$r_1 = y_1 - f(x_1)$	$r_2 = y_2 - f(x_2)$	$r_3 = y_3 - f(x_3)$	\dots	$r_n = y_n - f(x_n)$

Residualplot

(91)

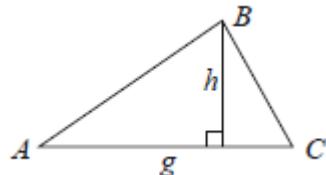


.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
2	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40
3	3	6	9	12	15	18	21	24	27	30	33	36	39	42	45	48	51	54	57	60
4	4	8	12	16	20	24	28	32	36	40	44	48	52	56	60	64	68	72	76	80
5	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
6	6	12	18	24	30	36	42	48	54	60	66	72	78	84	90	96	102	108	114	120
7	7	14	21	28	35	42	49	56	63	70	77	84	91	98	105	112	119	126	133	140
8	8	16	24	32	40	48	56	64	72	80	88	96	104	112	120	128	136	144	152	160
9	9	18	27	36	45	54	63	72	81	90	99	108	117	126	135	144	153	162	171	180
10	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200
11	11	22	33	44	55	66	77	88	99	110	121	132	143	154	165	176	187	198	209	220
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15	15	30	45	60	75	90	105	120	135	150	165	180	195	210	225	240	255	270	285	300
16	16	32	48	64	80	96	112	128	144	160	176	192	208	224	240	256	272	288	304	320
17	17	34	51	68	85	102	119	136	153	170	187	204	221	238	255	272	289	306	323	340
18	18	36	54	72	90	108	126	144	162	180	198	216	234	252	270	288	306	324	342	360
19	19	38	57	76	95	114	133	152	171	190	209	228	247	266	285	304	323	342	361	380
20	20	40	60	80	100	120	140	160	180	200	220	240	260	280	300	320	340	360	380	400

Reyð töl: Kvadrattöl

Vídd og ummál, rúmd og yvirflati á geometriskum skapum

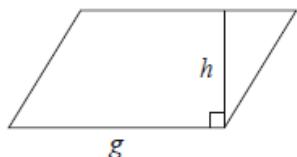
Tríkantur



h hædd
g grundlinja
V vídd

$$V = \frac{1}{2} \cdot g \cdot h$$

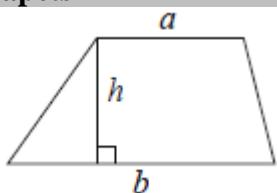
Parallelogramm



h hædd
g grundlinja
V vídd

$$V = h \cdot g$$

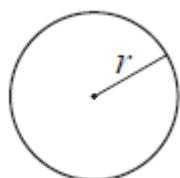
Trapets



h hædd
a,b parallellar síður
V vídd

$$V = \frac{1}{2} \cdot h \cdot (a + b)$$

Sirkul

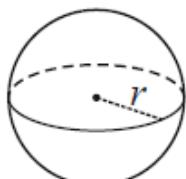


r radius
V vídd
U ummál

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

$$U = 2\pi \cdot r$$

Kúla

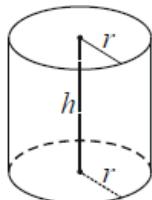


r radius
Y yvirflati
R rúmd

$$Y = 4\pi \cdot r^2$$

$$R = \frac{4}{3}\pi \cdot r^3$$

Sýlindari

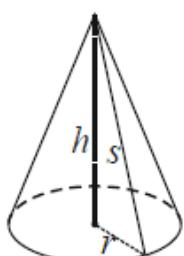


h hædd
r radius á grundflata
Y begin yvirflati
R rúmd

$$Y = 2\pi \cdot r \cdot h$$

$$R = \pi \cdot r^2 \cdot h$$

Keyla



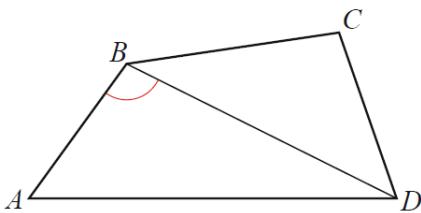
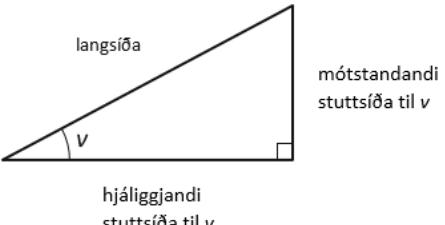
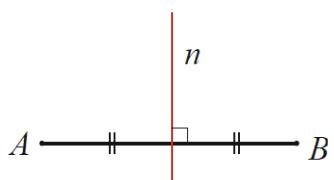
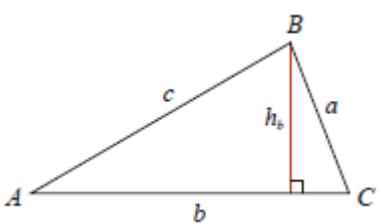
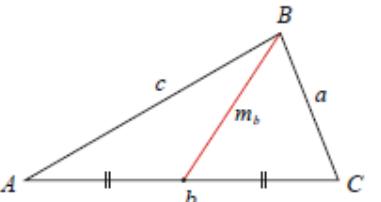
h hædd
s síðulinja
r radius á grundflata
Y begin yvirflati
R rúmd

$$Y = \pi \cdot r \cdot s$$

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

Symbol	Týdningur	Dómi, viðmerkingar v.m.
$\{ \dots, \dots \}$	mongd sett upp í lista	$\{-5, 0, 3, 10\}, \{2, 4, 6, \dots\}$
\mathbb{N}	mongd av teljítöllum	$\mathbb{N} = \{1, 2, 3, \dots\}$
\mathbb{Z}	mongd av heilum tölum	$\mathbb{Z} = \{\dots, -2, -1, 0, 1, 2, \dots\}$
\mathbb{Q}	mongd av brotum	töl, sum kunnu skrivast $\frac{p}{q}$, $p \in \mathbb{Z}, q \in \mathbb{N}$
\mathbb{R}	mongd av reellum tölum	
\in	er lutur í	$2 \in \mathbb{N}$
$[a;b]$	lokað interval	$[1;3] = \{x \in \mathbb{R} 1 \leq x \leq 3\}$
$]a;b]$	hálvopið interval	$]1;3] = \{x \in \mathbb{R} 1 < x \leq 3\}$
$[a;b[$	hálvopið interval	$[1;3[= \{x \in \mathbb{R} 1 \leq x < 3\}$
$]a;b[$	opið interval	$]1;3[= \{x \in \mathbb{R} 1 < x < 3\}$
\subset	sonn partsmongd	$\{1, 2, 3\} \subset \mathbb{N}$
\cap	felagsmongd	$A \cap B$
\cup	sammongd	$A \cup B$
\setminus	mongdar differensur	$A \setminus B$
\overline{A}	komplementer mongd	$U \setminus A$
\emptyset	tóm mongd	
	disjunktar mongdir	$A \cap B = \emptyset$
\times	produktmongd	$[-10;10] \times [-10;10]$
\wedge	”og” í meininingini ”bæði og” (konjunktiún)	$x < 2 \wedge y = 5$
\vee	”ella” í meininingini ”og/ella” (disjunktiún)	$x < 2 \vee x > 5$
\Rightarrow	”viðførir”, ”um ... so” (implikatiún)	$x = 2 \Rightarrow x^2 = 4$
\Leftrightarrow	”einsljóðandi”, ”um og bert um” (biimplikatiún)	$x^2 = 4 \Leftrightarrow x = -2 \vee x = 2$
$n!$	n fakultet	$n! = 1 \cdot 2 \cdots n$ fyri $n \geq 1$ $0! = 1$

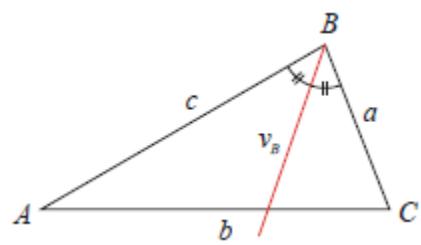
Symbol	Týdningur	Dømi, viðmerkingar v.m.
$f(x)$	virði av funktiónini fí x	úttalast ” f av x ”
$\text{Fm}(f)$	frummongd hjá f	tað sama sum definitónsmongd
$\text{Dm}(f)$	definitónsmongd hjá f	tað sama sum frummongd
$\text{Vm}(f)$	virðismongd hjá f	
$\log(x)$	logaritmufunktiónin við grundtalinum 10	$y = \log(x) \Leftrightarrow x = 10^y$
$\ln(x)$	natúrliga logaritmufunktiónin	$y = \ln(x) \Leftrightarrow x = e^y$
e^x	natúrliga eksponentialfunktiónin	e^x verður eisini skrivað $\exp(x)$
a^x	eksponentialfunktiónin við grundtali $a, a > 0$	$b \cdot a^x$ kallast av og á fyri eksponentialfunktión ella ein eksponentiel gongd
x^a	potensfunktión	$b \cdot x^a$ kallast av og á fyri potensfunktión ella ein potensgongd
$ x $	talvirði (absolut) av x	$ 3 = 3, -3 = 3$
$\sin(x)$	sinus	
$\cos(x)$	cosinus	
$\tan(x)$	tangens	$\tan(x) = \frac{\sin(x)}{\cos(x)}$
$\sin^{-1}(y)$	invers funktión til sinus	$\sin^{-1}(y) = x \Leftrightarrow \sin(x) = y$ $\sin^{-1}(0,5) = 30^\circ$ \sin^{-1} kann eisini skrivast Arcsin
$\cos^{-1}(y)$	invers funktión til cosinus	$\cos^{-1}(y) = x \Leftrightarrow \cos(x) = y$ $\cos^{-1}(0,5) = 60^\circ$ \cos^{-1} kann eisini skrivast Arccos
$\tan^{-1}(y)$	invers funktión til tangens	$\tan^{-1}(y) = x \Leftrightarrow \tan(x) = y$ $\tan^{-1}(1) = 45^\circ$ \tan^{-1} kann eisini skrivast Arctan
AB	linjustykkið AB	
$ \text{AB} $	longdin á linjustykkinum AB	
$\widehat{\text{AB}}$	sirkulbogin $\widehat{\text{AB}}$	
$ \widehat{\text{AB}} $	longdin á sirkulboganum $ \widehat{\text{AB}} $	

Symbol	Týdningur	Dømi, viðmerkingar v.m.
\parallel	"er parallelt við"	
\perp	"er vinkulrøtt á"	$l \perp m$ verður eisini lisið "l og m eru vinkulrættar"
$\angle A$	vinkul A	$\angle A = 110^\circ$ ella $A = 110^\circ$
$\angle ABD$	vinkul B í tríkantinum ABD	
	rættvinklaður tríkantur	
	miðnormalurin n fyri linjustykkið AB	
h_b	hæddin frá B á síðuna b ella á leingjanina av síðuni b	
m_b	medianurin frá B á síðuna b	

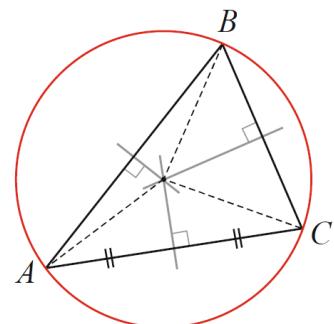
Symbol	Týdningur	Dømi, viðmerkingar v.m.
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V_B

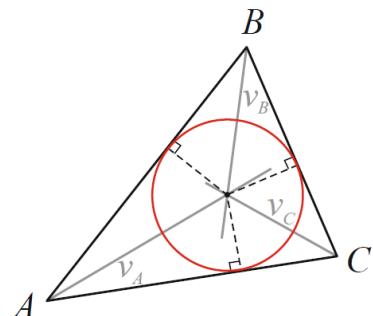
vinkulhálvbýtislinja
fyri vinkul B



umskrivaður sirkul
hjá tríkantinum ABC



innskrivaður sirkul
hjá tríkantinum ABC



Leitorðaskrá

A		N	
annuitetsslán	3	niðara fjórðingsmark	13, 14
annuitetsuppsparing	3		
B		O	
beint lutfall	4	ovara fjórðingsmark	13, 14
brotreglur	4		
C		Ó	
cosinus	6, 7, 20	óflokkað hagtöl	14
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L		sýlindari	18
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M		trapes	18
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		vigað miðal	3
		vinklar	21, 22
		vinkulhálvþýtislinja	22
		vinkulsummur hjá tríkantum	7
		víddin á tríkantum	7, 18
		Ø	
		øvut lutfall	4