

Teknisk Matematik

FACITLISTE

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2. udgave

PRAXIS – Nyt Teknisk Forlag

TEKNISK MATEMATIK 1 – FACITLISTE TIL 2.UDGAVE

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1. TAL OG ALGEBRA

1.01 –

1.02 –

1.03 a) $2a - 2b + 6$ b) $12a - 2b - 2c$ c) $-ac + 8bc - 3bd$ 1.04 a) - b) $-3a - b$ 1.05 a) $10a$ b) $4d - 6c$ c) $e - 9f$

1.06 -

1.07 a) 10 b) -5248 c) -3027 1.08 a) $7ab - 9b^2$ b) $4a - a^2$ c) $-1 - 3a + 2d - ad$ 1.09 a) $4a^2 + 9b^2$ b) $75c^2 + 49d^2$ c) $-201e^2 - 626f^2 - 158ef$ 1.10 a) $(6x - 9y)^2$ b) $(4a - 3b)(4a + 3b)$ c) $(7c + 2d)^2$ 1.11 a) $\frac{23}{24}$ b) $\frac{8a + 9b}{6}$ c) $\frac{12d + 37c}{15}$ 1.12 a) $\frac{19}{12x}$ b) $\frac{14x}{15y}$ c) $\frac{12x - 7y}{6y}$ 1.13 a) 0,04 b) 0,04 c) $-0,04$ d) 0,008 e) $-0,008$ f) $-0,008$ 1.14 a) -4 b) 0 c) -54

1.15 -

1.16 a) $1,6430m^2$ b) $16.430cm^2$ c) $1.643.000mm^2$

1.17 -

1.18 a) $a^{\frac{3}{4}}$ b) $b^{\frac{5}{4}}$ c) $c^{\frac{1}{5}}$ d) $(x+1)^{\frac{1}{2}}$ e) $(x+1)^{\frac{2}{3}}$ f) $(x+1)^{\frac{-2}{3}}$ 1.19 a) $-99,75$ b) 2 c) 278,03

1.20 1328mm

1.21 $x = 14mm$ 1.22 $b = 8mm$

1.23 0,4m

1.24 -

1.25 -

2. LIGNINGER OG ULIGHEDER

- 2.01 a) $G = (x \in \mathbb{R} | x \neq 0)$ b) $G = (x \in \mathbb{R} | x \neq 3)$ c) $G = (x \in \mathbb{R} | x \neq 3)$ d) $G = (x \in \mathbb{R} | x > 0)$ e) $G = (x \in \mathbb{R} | x > 3)$ f) $G = (x \in \mathbb{R} | x < 3)$
- 2.02 a) $G = \mathbb{R} : x = 8$ b) $G = \mathbb{R} : x = 10$ c) $G = \mathbb{R} : x = 4$
- 2.03 a) - b) $x = -\frac{2}{3}$
- 2.04 a) $G = \mathbb{R} : x = 5^3$ b) $G = (x \in \mathbb{R} | x \neq 3) : x = 6$ c) $G = (x \in \mathbb{R} | x \neq 3) : x = 8$
- 2.05 a) $G = \mathbb{R} : x = 2$ b) $G : x \neq \left(-6, \frac{7}{3}\right) : x = 7$ c) $G : x \neq (0, 2) : x = -2$
- 2.06 $b = 60 \text{ mm}$
- 2.07 $R = 4,62 \text{ ohm}$
- 2.08 $t_2 = 103,33^\circ\text{C}$
- 2.09 $n = 1593 \text{ omdr} / \text{minut}$
- 2.10 a) $v = \frac{\pi \cdot d \cdot L \cdot i}{1000 \cdot t \cdot s}$ b) $d = \frac{1000 \cdot t \cdot v \cdot s}{\pi \cdot L \cdot i}$ c) $s = \frac{\pi \cdot d \cdot L \cdot i}{1000 \cdot t \cdot v}$
- 2.11 a) $m = \frac{2a}{z_1 + z_2}$ b) $z_1 = \frac{2a - mz_2}{m}$ c) $z_2 = \frac{2a - mz_1}{m}$
- 2.12 $92 \text{ kg}, 108 \text{ kg}$
- 2.13 $55, 56, 57, 58$
- 2.14 30
- 2.15 -1
- 2.16 $98,28 \text{ kr}$
- 2.17 $27,08 \%$
- 2.18 $5,41 \%$
- 2.19 a) $B = 20,83$ $C = 21,23$ $D = 21,63$ b) $E = 21,43$ $F = 21,98$
 $G = 22,14$
- 2.20 a) $G = \mathbb{R} : x = 5 \text{ og } y = 2$ b) $G = \mathbb{R} : x = 3 \text{ og } y = 2$ c) $G = \mathbb{R} : x = 1,33 \text{ og } y = 6$
- 2.21 a) $G : x \neq \{-2, 1\} \text{ og } y \neq \{-3, -1\} : x = 4 \text{ og } y = 1$
b) $G = \mathbb{R} : x = 3 \text{ og } y = 10$
c) $G : x \neq 0 \text{ og } y \neq 0 : x = 0,33 \text{ og } y = 0,5$
- 2.22 $145,215$
- 2.23 $14,78$
- 2.24 $5,10$
- 2.25 a) $G = \mathbb{R} : x = -1, y = 3, z = 0$ b) $G = \mathbb{R} : x = 6, y = 4, z = 3$
c) $G : x \neq 1,5, y \neq \{-5, 1\}, z \in \mathbb{R} : x = -3,115, y = -2,692, z = -5,769$
- 2.26 a) $x = 0 \text{ eller } x = 3,5$ b) $x = 0 \text{ eller } x = 2,33$ c) $x = 0 \text{ eller } x = 5,33$
- 2.27 a) $x = \pm 10$ b) $x = \pm 8$ c) $x = \pm 2$
- 2.28 a) $G = \mathbb{R} : x = -1 \text{ eller } x = -0,667$ b) $G = \mathbb{R} : x = 0,33$ c) $G = \mathbb{R} : \text{ingen l sning}$
- 2.29 a) $G : x \neq \{-2, 3\} : x = 4,122 \text{ eller } x = -1,455$
b) $G : x \neq 0 : x = -2 \text{ eller } x = 0,667$
c) $G : x \neq \{-5,372; -4; 0,372\} : x = -3,645 \text{ eller } x = 1,646$
- 2.30 $x = 15 \text{ og } y = 12 \text{ eller } x = 12 \text{ og } y = 15$
- 2.31 $x = 6$

2.32 $x = 13 \log y = 7$ eller $x = 7 \log y = 13$

2.33 a) $G = R : x = \pm 2$ eller $x = \pm 3$ b) $G = R : x = \pm 0,9540$

c) $G = R : x = 2,924$ eller $x = 2,520$

2.34 a) $G = R : x = 3 \log y = -1$ eller $x = -0,2 \log y = 1,4$

b) $G = R : x = 3,5 \log y = -5,5$ eller $x = -0,1 \log y = 1,7$

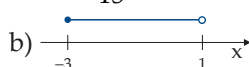
c) $G = R : x = 1 \log y = 6$ eller $x = 8 \log y = 3$

2.35 a) $G : x \geq -2 : x = 14$ b) $G : x \geq 2, x = 4$ c) $G : x \geq -2 : x = 4$

2.36 a) $G = R : x = 2$ eller $x = 14$ b) $G = R : x = -1$

c) $G = R : x \neq 3 : x = -0,136$ eller $x = 2,936$ eller $x = 3,055$

2.37 a) $x > 5,5$ b) $x < -1$ c) $x < \frac{1}{15}$



2.40 a) $L =]2,6;\infty[$ b) $L = [-8,5;3[$ c) $L =]6;\infty[$

2.41 Stigning = $52,8m$

2.42 a) Fald $1,139\%$

b) $2 = 15,335$ $3 = 15,734$ $4 = 16,133$ $5 = 16,532$

c) $2a = 15,615$ $2b = 15,895$ $2c = 16,175$ $4a = 16,413$ $4b = 16,693$ $4c = 16,973$
 $6a = 17,210$ $6b = 17,490$ $6c = 17,770$

2.43 $H = 18cm, L = 24cm$

2.44 a) $14x + 6y = 78$ og $10x + 8y = 78$

b) $x = 3cm$ og $y = 6cm$

c) $Areal1 = 234cm^2$, $Areal2 = 252cm^2$

3. GEOMETRI

3.01 a) $65^\circ, 155^\circ$ b) $24^\circ, 114^\circ$ c) $8^\circ, 98^\circ$ d) $-, 70^\circ$

3.02 Lilleviser : $0,5^\circ / minut$ storeviser : $6^\circ / minut$

3.03 a) 90° b) 150° c) 50°

3.04 120°

3.05 40°

3.06 $A = 67,5^\circ, B = 62,5^\circ, C = 50^\circ$

3.07 –

3.08 –

3.09 –

3.10 a) A og C b) Modstående side er c , hosliggende sider er a og b

3.11 $72,45cm$

3.12 $1,29m, 1,93m, 2,58m$

3.13 $28,28cm$

3.14 $52,1^\circ$

3.15 67°

3.16 $22,5^\circ, 67,5^\circ$

3.17 $4^\circ, 44^\circ, 132^\circ$

3.18 –

- 3.19 –
 3.20 –
 3.21 –
 3.22 –
 3.23 –
 3.24 –
 3.25 –
 3.26 a) $45,05^\circ$ b) $84,5^\circ$ c) $129,54^\circ$
 3.27 $AB = 3,33 \text{ meter}$
 3.28 a) 45emner b) 49,5 % c) 31emner d) 69,95 %

4. TRIGONOMETRI

- 4.01 –
 4.02 –
 4.03 a) - b) - c) - d) $x = 7,47^\circ, y = 83,68^\circ, z = 67,38^\circ$
 4.04 a) $B = 42,7^\circ, a = 3,90 \text{ cm}, b = 3,60 \text{ cm}$
 b) $A = 42,7^\circ, a = 16,24 \text{ cm}, c = 23,95 \text{ cm}$
 c) $A = 53,6^\circ, B = 36,4^\circ, a = 5,15 \text{ cm}$
 4.05 a) $B = 53,84^\circ, C = 36,16^\circ, b = 22,85 \text{ cm}$
 b) $C = 36,6^\circ, a = 7,63 \text{ cm}, c = 5,66 \text{ cm}$
 c) $A = 28,61^\circ, C = 61,39^\circ, b = 12,53 \text{ cm}$
 4.06 a) $m_a = 6,08 \text{ cm}$ b) $v_B = 4,51 \text{ cm}$ c) $h_c = 3,28 \text{ cm}$
 4.07 a) $m_s = 3 \text{ cm}$ b) $v_T = 2,91 \text{ cm}$ c) $h_s = 2,23 \text{ cm}$
 4.08 a) $v_1 = 16,64^\circ, v_2 = 163,36^\circ$ b) $v_1 = 38,43^\circ, v_2 = 141,57^\circ$
 c) $v_1 = 60,96^\circ, v_2 = 119,04^\circ$
 4.09 –
 4.10 a) $B = 42,2^\circ, C = 67,8^\circ, c = 6,9 \text{ cm}$
 b) $C = 96,1^\circ, c = 18,4 \text{ cm}, b = 12,47 \text{ cm}$
 c) Løsning 1: $B = 43,9^\circ, A = 115,8^\circ, a = 6,48 \text{ cm}$
 Løsning 2: $B = 136,1^\circ, A = 23,6^\circ, a = 2,88 \text{ cm}$
 4.11 –
 4.12 –
 4.13 a) $A = 70,9^\circ, B = 49,1^\circ, c = 9,17 \text{ cm}$
 b) $B = 26,2^\circ, C = 33,8^\circ, a = 9,03 \text{ cm}$
 c) $A = 49,2^\circ, B = 62,3^\circ, C = 68,5^\circ$
 4.14 a) $B = 71,01^\circ, C = 42,39^\circ, a = 4,46 \text{ cm}, c = 3,28 \text{ cm}$
 b) Løsning 1: $A = 108,9^\circ, C = 29,5^\circ, b = 4,77 \text{ cm}, c = 3,54 \text{ cm}$
 Løsning 2: $A = 21,08^\circ, C, B = 117,32^\circ, b = 12,55 \text{ cm}, c = 16,80 \text{ cm}$
 c) $A = 33,28^\circ, C = 88,72^\circ, a = 4,25 \text{ cm}, b = 6,57 \text{ cm}, c = 7,74 \text{ cm}$
 4.15 a) $Areal = 20,91 \text{ m}^2$
 b) $Areal = 43,8 \text{ cm}^2$
 c) $Areal = 9,6 \text{ cm}^2, R = 5,6 \text{ cm}, r = 1 \text{ cm}$
 4.16 $AD = CD = 4,91 \text{ cm}, A = 124,43^\circ, B = 81,30^\circ, C = 116,27^\circ, Areal = 10,38 \text{ cm}^2$
 4.17 $31,34 \text{ m}$
 4.18 $v = 9,5^\circ$

- 4.19 $x = 30,9 \text{ mm}$
 4.20 $s = 24 \text{ mm}$
 4.21 $a = 1,8 \text{ mm}, b = 6,5 \text{ mm}$
 4.22 $94,73 \text{ cm}$
 4.23 $a = 11,55 \text{ mm}$
 4.24 $a = 2,01 \text{ m}, b = 2,84 \text{ m}, c = 3,92 \text{ m}$
 4.25 $a = 2,40 \text{ m}, b = 4,50 \text{ m}$
 4.26 $L = 90,55 \text{ mm}$
 4.27 $d = 152 \text{ mm}$
 4.28 $h = 46 \text{ mm}$
 4.29 $d = 4,64 \text{ cm}$
 4.30

	1	2	3	4	5	6	7	8	9	10
x	80	118,11	58	41,89	102	195,91	223,62	179,91	168,2	211,91
y	108	130	146,11	86	69,89	76,94	92,94	104,65	60,94	49,23

- 4.31 $R = 164 \text{ N}, a = 27,6^\circ$
 4.32 $A_{\text{real}} = 465,9 \text{ mm}^2$
 4.33 $a_1 = 23,2 \text{ mm}, a_2 = 37,8 \text{ mm}, b_1 = 5 \text{ mm}, b_2 = 13,8 \text{ mm}$
 4.34 $d = 80 \text{ mm}$
 4.35 $a = 196,67 \text{ mm}$

5. CIRKLEN

- 5.01 $b = 4,19 \text{ cm}$
 5.02 $v = 256,8^\circ$
 5.03 $A_{\text{real}} = 202,69 \text{ cm}^2$
 5.04 $R = 9,83 \text{ cm}$
 5.05 16%
 5.06 $A_{\text{real}} = 6,18 \text{ cm}^2$
 5.07 $v = 46,32^\circ$
 5.08 $A_{\text{real}} = 0,289 \text{ m}^2$
 5.09 $A_{\text{real}} = 0,82 \text{ cm}^2$
 5.10 a) $h = 0,68 \text{ cm}$ b) $A_{\text{real}1} = 1,41 \text{ cm}^2, A_{\text{real}2} = 11,16 \text{ cm}^2$
 5.11 842 mm
 5.12 $L = 1891 \text{ mm}$
 5.13 $L = 109 \text{ mm}$
 5.14 $a = 162,15^\circ$
 5.15 $A_{\text{real}} = 273,7 \text{ mm}^2$
 5.16 $A_{\text{real}} = 63,6 \text{ cm}^2$
 5.17 $A_{\text{real}} = 676 \text{ mm}^2$
 5.18 $A_{\text{real}} = 4,9 \text{ m}^2$
 5.19 $A_{\text{real}} = 885,6 \text{ cm}^2$
 5.20 $A_{\text{real}} = 5493,4 \text{ mm}^2$
 5.21 $A_{\text{real}} = 312 \text{ mm}^2$
 5.22 $A_{\text{real}} = 1474,45 \text{ m}^2$
 5.23 $L = 6,84 \text{ m}$

6. OVERFLADEBESTEMMELSE OG UDFOLDNINGER

6.01 $6145,2 \text{ cm}^2, 0,61452 \text{ m}^2$

6.02 $93,84 \text{ m}^2$

6.03 $339,41 \text{ m}^2$

6.04 Rækkeevne $4 \frac{\text{m}^2}{\text{liter}}$: 10 liter spand Rækkeevne $6 \frac{\text{m}^2}{\text{liter}}$: 5 liter spand

6.05 a)- b) $77,25^\circ$ c) $59,86 \text{ cm}^2$ d) -

6.06 a) - b) $h = 5,29 \text{ cm}$ c) $69,29^\circ$ d)-

6.07 a) - b) $57,69^\circ$ c) $15783,77 \text{ mm}^2$ d) -

6.08 a) $a = 52,36 \text{ cm}, b = 11,18 \text{ cm}, c = 6,18 \text{ cm}$ b) $89,92 \%$

6.09 a) $213,66 \text{ cm}^2$ b) $v = 209,3^\circ, k = 16,64 \text{ cm}$

6.10 a) $1963,5 \text{ cm}^2$

b) $s_2 = 33,33 \text{ cm}, s_1 = 8,33 \text{ cm}, v = 216,02^\circ, k = 63,39 \text{ cm}$

6.11 $17236,35 \text{ mm}^2$

6.12 $d = 6,67 \text{ cm}$

6.13 $R = 8,01 \text{ cm}$

6.14 a) Grundfladekant = $11,31 \text{ cm}$, Sidekant = $8,94 \text{ cm}$

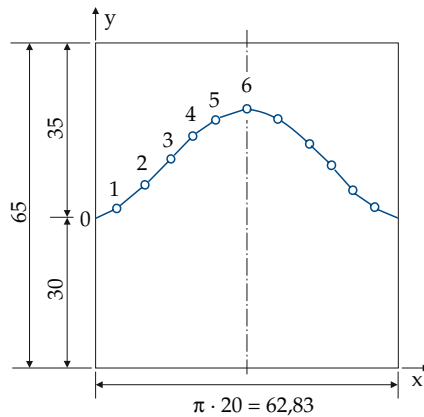
b) $v = 35,27^\circ$

c) $v = 26,57^\circ$

d) $284,6 \text{ cm}^2$

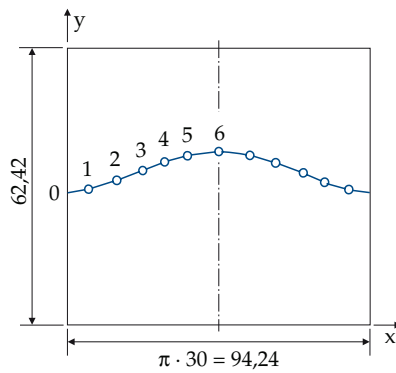
6.15 $102,54 \text{ cm}^2$

6.16



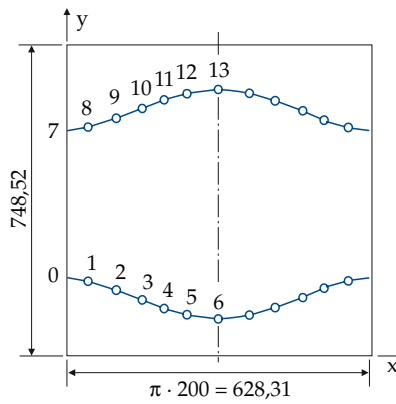
	0	1	2	3	4	5	6
x	0	5,24	10,47	15,71	20,94	26,17	31,41
y	30	31,34	35	40	45	48,66	50

6.17



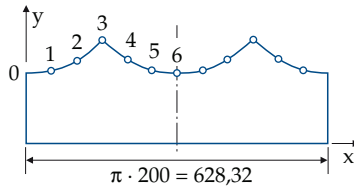
	0	1	2	3	4	5	6
x	0	7,85	15,71	23,56	31,41	39,26	47,11
y	25	25,83	28,11	31,21	34,32	36,59	37,42

6.18



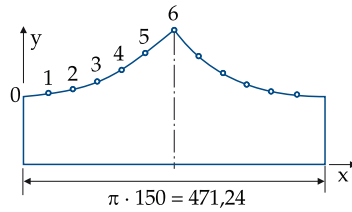
0 : (0; 232,84) 1 : (52,36; 227,29) 2 : (104,71; 212,13)
3 : (157,08; 191,42) 4 : (209,44; 170,71) 5 : (261,80; 155,55)
6 : (314,16; 150) 7 : (0; 515,68) 8 : (52,36; 521,18)
9 : (104,71; 536,39) 10 : (157,08; 557,10) 11 : (209,44; 577,81)
12 : (261,80; 592,97) 13 : (314,16; 598,52)

6.19



0 : (0; 150) 1 : (52,36; 163,40) 2 : (104,72; 200) 3 : (157,08; 250)
4 : (209,44; 200) 5 : (261,80; 163,40) 6 : (314,16; 150)

6.20



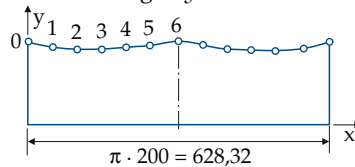
0: (0,150) 1: (39,27;150,33) 2: (78,54;154,76) 3: (117,81;170,10)
 4: (157,08;200,78) 5: (196,35;246,02) 6: (235,62;300)

6.21 a) $y = 0,335$ b) $605,9 \text{ m}^2$ 6.22 a) $7853,98 \text{ m}^2$ b) $7198,29 \text{ mm}^2$

6.23 9,5 liter

6.24 a) 13 m^2 b) Cirkelringsudsnit : $R = 1,13 \text{ m}$, $r = 0,283 \text{ m}$, $v = 254,87^\circ$, $k = 1,79 \text{ m}$ 6.25 a) $16,73 \text{ m}$ b) $114,04 \text{ m}^2$ 6.26 Del1 – Cirkeludsnit : Centervinkel = $254,55^\circ$, Radius = $169,71$, korde = $270,09$ Del2 – Rektangel : Bredde = $471,23 \text{ mm}$, Højde = 100 mm Del3 – Cirkelringsudsnit : $R = 250 \text{ mm}$, $r = 125 \text{ mm}$, $v = 216^\circ$, $k = 475,52 \text{ mm}$ Del4 – Rektangel : Bredde = $942,48 \text{ mm}$, Højde = 400 mm

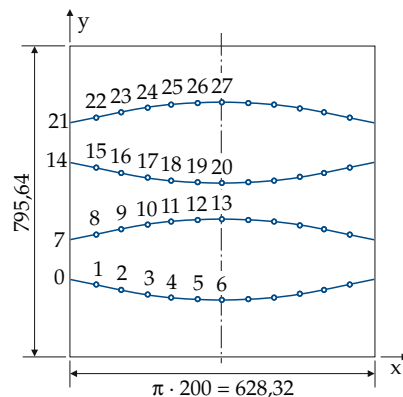
Del5 – Tilslutningsstykke



0: (0;138,20) 1: (52,36;127,52) 2: (104,72;108,52) 3: (157,08;100)
 4: (209,44;108,58) 5: (261,80;127,52) 6: (314,16;138,20)

Del6 – Cirkelringsudsnit : $R = 912,64 \text{ mm}$, $r = 608,42 \text{ mm}$, $v = 59,17^\circ$, $k = 901,17 \text{ mm}$

Del7 – Bøjning



0: (0;119,35) 1: (52,36;116,68) 2: (104,72;109,40) 3: (157,08;99,46)
 4: (209,44;89,51) 5: (261,80;82,33) 6: (314,16;79,56) 7: (0;278,47)
 8: (52,36;281,14) 9: (104,72;288,42) 10: (157,08;298,38)
 11: (209,44;308,31) 12: (261,80;315,59) 13: (314,16;318,26)
 14: (0;517,70) 15: (52,36;514,50) 16: (104,72;507,22) 17: (157,08;497,30)

18: (209,44;487,33)	19: (261,80;480,05)	20: (314,16;477,38)
21: (0;676,29)	22: (52,36;678,96)	23: (104,72;686,24)
24: (157,08;696,22)	25: (209,44;706,13)	
26: (261,80;713,41)	27: (314,16;716,08)	

7. BESTEMMELSE AF RUMFANG

- 7.01 90.000 liter
 7.02 $V = 27 \text{ cm}^3$, $A = 54 \text{ cm}^2$
 7.03 2,47 cm
 7.04 18 m^3
 7.05 1682 kg
 7.06 a) 12,7 cm b) 678 cm^2
 7.07 a) 1050 liter b) 350 liter
 7.08 752 kg
 7.09 a) 213 cm^3 b) 236 cm^2
 7.10 a) 135 cm^3 b) 179 cm^2
 7.11 a) $86,9 \text{ cm}^3$ b) $127,5 \text{ cm}^2$
 7.12 a) 2,76 cm b) 493 cm^3 c) 424 cm^2
 7.13 a) $224,5 \text{ cm}^3$ b) 176 cm^2 c) 103°
 7.14 469 m^3
 7.15 a) $75,3 \text{ cm}^3$ b) $170,8 \text{ cm}^2$
 7.16 35,05 %
 7.17 a) $A = 125,22$ b) $V = 56,55$
 7.18 a) $A = 724,92$ b) $V = 669,79$
 7.19 a) $137.500.000 \text{ m}^3$ b) $100.000.000 \text{ m}^3$
 7.20 35 timer 15 minutter 23 sekunder
 7.21 a) $V = 18,654 \text{ liter}$ b) $0,829 \text{ m}^2$ c)
 $x = 1212 \text{ mm}$, $y = 600 \text{ mm}$, $z = 1050 \text{ mm}$
 7.22 10,088 liter
 7.23 a) 9,802 kg b) 2,246 kg c) 3,308 kg

8. ANALYTISK PLANGEOMETRI

- 8.01 $AB = 12,17$, $AC = 10,30$, $BC = 7,62$
 8.02 a) Ingen løsning b) $x = 2$ c) $x = 8$ eller $x = -4$
 8.03 $y = 8,71$ eller $y = -4,71$
 8.04 a) $m_{AB}(1,5;3,5)$, $m_{AC}(2,5;0)$, $m_{BC}(-2;1,5)$
 b) $m_a = 8,02$, $m_b = 7,43$, $m_c = 6,04$
 8.05 a) Areal = 78 b) Areal = 59 c) Areal = 559
 8.06 a) Areal = 13 b) $A = 85,60^\circ$, $B = 77,01^\circ$, $C = 17,39^\circ$
 8.07 a) Areal = 34 b) $A = 94,76^\circ$, $B = 72,90^\circ$, $C = 102,34^\circ$, $D = 90^\circ$
 8.08 Areal = 30,5
 8.09 a) - b) $A(4,2)$, $B(7;3,5)$, $C(7,2)$
 c) $A = 26,57^\circ$, $B = 63,43^\circ$, $C = 90^\circ$ d) Areal = 2,25

- 8.10 a) - b) $A(0,0), B(-5,10), C(-5,-4), D(-1,-4)$
 c) $A = 139,39^\circ, B = 26,57^\circ, C = 90^\circ, D = 104,04^\circ$ d) $Areal = 43$
- 8.11 a) $(3,15)$ b) $(2,0)$ c) $(-0,17;3,20)$
- 8.12 a) - b) $A(2,1), B(6,3), C(6,-1), D(4,-1)$ c) $Areal = 10$
- 8.13 $v = 24,78^\circ$
- 8.14 $v = 66,89^\circ$
- 8.15 $A = 18,43^\circ, B = 45^\circ, C = 116,57^\circ$
- 8.16 a) $y = 0,5x - 3$ b) $y = 2x + 6$ c) $y = -0,25x + 9$
- 8.17 a) $y = 0,29x - 3,14$ b) $y = 0,133x$ c) $y = 0,89x + 2,05$
- 8.18 *Linjerne er parallelle*
- 8.19 $y = -x + 7$
- 8.20 $y = 0,7x + 2$
- 8.21 $y = -0,84x - 3$
- 8.22 $y = -0,86x + 7,29$
- 8.23 *Linjerne står ikke vinkelret på hinanden*
- 8.24 $y = -1,5x + 0,5$
- 8.25 $h_a : y = x - 4, h_b : y = -0,33x - 3, h_c : y = -3,25$
- 8.26 a) $y = -1,5x + 4$ b) $Areal = 15$
- 8.27 a) $(3;1,25)$ b) $R = 5,15$
- 8.28 a) $(4,26;2,31)$ b) $r = 2,3$
- 8.29 $(4,92;5,33)$
- 8.30 a) $A(2,7), B(7,-3), C(10,3)$ b) $A = 36,86^\circ, B = 53,14^\circ, C = 90^\circ$
 c) $y = -x + 9$ d) $y = -1,08x + 9,15$ e) $y = -0,5x + 8$
- 8.31 a) $r = 3, (a,b) = (0,0)$ b) $r = 3, (a,b) = (2,-3)$
 c) *Ligningen fremstiller ikke en cirkel*
- 8.32 -
- 8.33 a) $y = -4,46$ eller $y = 2,46$
 b) $(-6,87;0), (0,87;0), (0;-3,65), (0;1,65)$
- 8.34 a) $y = 0,93x, y = -0,27$ b) $v = 58,03^\circ$
- 8.35 $(x-3)^2 + (y+1)^2 = 3,16^2$
- 8.36 a) - b) $B(7,96;-1,40), C(1,03;-6,55)$ c) $Areal = 15,35$
- 8.37 a) - b) - c) *Kl.13.02* d) *Station E* e) - f) *Kl.13.29*
- 8.38 a) - b) - c) -
 d) *Lys I : 38 - 78 sek. Lys II : 74 - 114 sek. Lys III : 122 - 162 sek.*
Lys IV : 174 - 214 sek. e) $55 \frac{km}{time}, 46 \frac{km}{time}$
- 8.39 a) $(x-390,65)^2 + (y+500)^2 = 500^2$ b) $A(-94,5;-379), B(390,65;0)$
 c) $118,08 m$
- 8.40 a) $R = 72,5 m$ b) $x^2 + (y+52,5)^2 = 72,5^2$
 c) *Stængerne nummereres fra venstre:*
stang 1 = 40 m, stang 2 = 32,03 m, stang 3 = 26,50 m, stang 4 = 22,81 m, stang 5 = 20,69 m
stang 6 = 20 m, stang 7 = 20,69 m, stang 8 = 22,81 m, stang 9 = 26,50 m, stang 10 = 32,03 m
stang 11 = 40 m, stang 12 = 51,8 m

9. FUNKTIONER

9.01 a) *nej* b) *ja*9.02 a) $Dm(f) = [-4; 4[$, $Dm(g) =]-3; 4]$ b) $Vm(f) = [-3; 3]$, $Vm(g) = [-2; 3[$

c) $f(-1) = 2$, $f(2) = 3$, $g(-1) = -1$, $g(2) = 2$

9.03 a) $Dm(f) = \mathbb{R}$, $Vm(f) = \mathbb{R}$, $f(2) = 2$

b) $Dm(f) = \left\{x \in \mathbb{R} \mid x \neq \frac{4}{3}\right\}$, $Vm(f) = \{y \in \mathbb{R} \mid y \neq 0\}$, $f(2) = 0,5$

c) $Dm(f) = \mathbb{R}$, $Vm(f) = [-1; \infty[$, $f(2) = 3$

d) $Dm(f) = \{x \in \mathbb{R} \mid x \neq 1\}$, $Vm(f) =]-\infty; -1] \cup]0; \infty[$, $f(2) = \frac{1}{3}$

e) $Dm(f) = \mathbb{R}$, $Vm(f) = [1; \infty[$, $f(2) = 5$

f) $Dm(f) = \mathbb{R}$, $Vm(f) =]0; 1]$, $f(2) = 0,2$

9.04 a) *f* er aftagende i $]-5; -2]$ og $[3; 5]$, *f* er voksende i $[-2; 3]$

b) Lokalt max : $(3, 1)$ og lokalt min : $(-2, -2)$

c) *g* er voksende i $]-5; -3]$ og $[1; 4[$, *g* er aftagende i $[-3; 1]$

d) Lokalt max : $(-3, 3)$, Lokalt min : $(1, -3)$

9.05 a) *f* er aftagende i $]-\infty; 2]$, *f* er voksende i $[2; \infty[$

b) *g* er aftagende i $]-\infty; -2]$ og $[0; 2]$, *g* er voksende i $[-2; 0]$ og $[2; \infty[$

c) *h* er voksende i $]-\infty; -1]$ og $[1; \infty[$, *h* er aftagende i $[-1; 1]$

9.06 a) $A(1, 2)$, $B(16, 17)$, $C(6, -3)$ b) $v_c : f(x) = -6,165x + 34$

c) $m_b : f(x) = 1,4x - 5,4$ d) $h_a : f(x) = -0,5x + 2,5$

9.07 a) *Lige* b) *Lige* c) *Ulige* d) *Ulige*9.08 a) *Ulige* b) *Hverkenlige eller ulige* c) *Lige* d) *Ulige*9.09 a) $(0, -4)$ b) $(4, 0)$ c) $(4, -2)$ d) $(0, 8)$ e) $(-8, 0)$ f) $(-8, 1)$

9.10 $f(x) = 0,1389(x + 4)^2 + 5$

9.11 $f(x) = -0,1944(x+4)^2 + 5$

9.12 1: a) $x = -1,40$, $(-1,40; 20,25)$ b) $(0; 18,29)$ c) $(-5,9; 0), (3,1; 0)$

2: a) $x = 4$, $(4, -3)$ b) $(0; 45)$ c) $(3, 0), (5, 0)$

3: a) $x = 1$, $(1; 12,5)$ b) $(0; 10,5)$ c) $(-1,5; 0), (3,5; 0)$

9.13 a) $f(x) = 1,78x^2 + 6,22x - 5$ b) $(-4,05; -1,03), (0,83; 1,42)$

9.14 a) $f(x) = 3x^2 + 2x + 1$ b) $f(x) = 5x + 7$

9.15 $(-13,21; -28,42), (1,21; 0,42)$

9.16 1: $(-1,12; 0), (1,34; 0)$ 2: $(-2,13; 0), (0,19; 0), (4,94; 0)$

3: $(-2,0), (-1,0), (1,0), (2,0)$

9.17 a) $L = [-1,33; 0,33]$ b) $L =]-2,53; 0,53[$ c) $L =]1; 4[$ d) $L = \mathbb{R}$

9.18 a) $L =]-5; 3[$ b) $L = [-15; -2,5[$ c) $L =]-\infty; -3[$ eller $] -2,5; \infty[$

9.19 a) $G: x \geq 0,75, x = 7$ b) $G: x \geq \frac{4}{7}, x = 4$

c) $G: x \geq 2,5, x = 7$ eller $x = 3$

9.20 $f(x) = \begin{cases} 0,5x + 4 & \text{for } x \geq -8 \\ -0,5x - 4 & \text{for } x < -8 \end{cases}$

9.21 a) $f(x) = \begin{cases} x^2 - 8x + 12 & \text{for } x \in]-\infty; 2] \text{ og } [6; \infty[\\ -(x^2 - 8x + 12) & \text{for } x \in]2; 6[\end{cases}$

b) $x = 1,48$ eller $x = 6,77$ eller $x = 2,87$ eller $x = 4,88$

9.22 $(aob)(x) = 0,5x + 2,5, (boa)(x) = -0,5x + 4 \text{ m}$

9.23 $(cod)(x) = \frac{3}{x}, Dm(cod) = \{x \in \mathbb{R} \mid x \neq 0\}, (doc)(x) = \frac{x+2}{x-1}, Dm(doc) = \{x \in \mathbb{R} \mid x \neq 1\}$

9.24 a) $f^{-1}(x) = 0,25x - 0,5$ b) $Dm(f^{-1}) = \{x \in \mathbb{R} \mid -2 \leq x < 10\}$

9.25 a) $f^{-1}(x) = \sqrt{x+2}$ b) $Dm(f^{-1}) = \{x \in \mathbb{R} \mid -2 \leq x < \infty\}$

9.26 a) $x = 20 \text{ cm}$ b) $V = 40.000 \text{ cm}^3$

9.27 $x = 100 \text{ m}, y = 63,67 \text{ m}$

9.28 $a = 4 \text{ m}, b = 2,5 \text{ m}$

9.29 Stængerne nummereres fra venstre: 1 = 15,00 m, 2 = 12,48 m, 3 = 10,52 m, 4 = 9,12 m, 5 = 8,28 m, 6 = 8,00 m, 7 = 8,28 m, 8 = 9,12 m, 9 = 19,52 m, 10 = 12,48 m, 11 = 15,00 m, 12 = 18,08 m, 13 = 21,72 m

9.30 a) 14 m b) 28,71 sek. c) 10 m d) 25 sek.