1.1. $\frac{x^{n+2}}{x^{n-2}} = \frac{x^{n-2+4}}{x^{n-2}} = x^4$

1.2.

$x^{-1} \cdot 8 = 2$

$x^{-1} = \frac{2}{2^3} = \frac{1}{4}$

$x = 4$

1.3.

$(5^{10})^0 = 1$

1.4.

$\frac{\sqrt{4x}}{\sqrt{x}} = \frac{2\sqrt{x}}{\sqrt{x}} = 2$

1.5. $x^2 + (x+1)^2 = (x+2)^2$

$x^2 + x^2 + 2x + 1 = x^2 + 4x + 4$

$x^2 - 2x - 3 = 0$

$(x+1)(x-3) = 0$

$x_1 = -1$

$x_2 = 3$

1.6.

$2^x > 1024$

$2^x > 2^{10}$

$x > 10$

2.1.

C°	F°
0	32
100	212

$y = 32 + 1{,}8x$

$32 + 1{,}8x = x$

$32 = -0{,}8x$

$x = -40$

2.2. $f(x) = 5x + 4$

$f(3) = 5 \cdot 3 + 4 = 19$

2.3.

$x^2 - 4x + 3 = 0$

$4 \pm \sqrt{16 - 12}$ / 2 / 3

2.4. $10 \cdot 1{,}02^{30} = 59{,}4313$

2.5. $e^{\ln 5} = 5$

3.1. $\sum_{i=1}^{\infty} \frac{12}{6^i}$

$\frac{12}{6} + \frac{12}{36} + \frac{12}{212} \dots$

$a_n = 12\frac{1}{6^i}$ $a = 12$ $b = \frac{1}{6}$

$\frac{12 \cdot \frac{1}{6}}{1 - \frac{1}{6}} = \frac{2}{\frac{5}{6}} = \frac{12}{5}$

3.2.

$\lim_{x \to} \frac{6^{(1-x)}}{x} = \frac{6^{1-x+x}}{x \cdot 6^x} = \frac{6}{x \cdot 6^x} \approx \frac{6}{1 \cdot 6^1} = 1$

3.3.

$f(x) = x^5 - 8$

$f'(x) = 5x^4$

$f'(-3) = 5 \cdot (-3)^4 = 81 \cdot 5 = 405$

3.4.

$\frac{\partial}{\partial x} \frac{x^3 + 2x - 1}{x - 2} = ?$

$\left(\frac{f}{g}\right)' = \frac{f'g - fg'}{g^2}$

$\frac{\partial}{\partial x} \frac{x^3 + 2x - 1}{x - 2} = \frac{(3x^2 + 2)(x-2) - (x^3 + 2x - 1) \cdot 1}{(x-2)^2} =$

$= \frac{2x^3 - 6x^2 - 3}{x^2 - 4x + 4}$

3.5.

$$\frac{d^2}{dx^2} 4x^4 + 4x^2$$

$$a_1 = 16x^3 + 8x$$

$$a_2 = 48x^2 + 8$$

3.6.

$$\frac{d}{dx} \frac{\ln x}{e^x} = \frac{\frac{1}{x} \cdot e^x - \ln x \cdot e^x}{(e^x)^2} =$$

$$= \frac{\frac{1}{x} - \ln x}{e^x}$$

3.7.

$f(x) = 3x^2 - 5x + 2$

$f'(x) = 6x - 5$

$0 = 6x - 5$

$\frac{5}{6} = x$

$f''(x) = 6$

	$-\infty, \frac{5}{6}$	$\frac{5}{6}$	$\frac{5}{6}, \infty+$
$f(x)$	↘	local min.	↗
$f'(x)$	−	0	+
$f''(x)$	+	+	+

3.8.

$f(x, y) = x^2 + y^3$

$f(2, 3) = 31$

3.9.

$f(x, y) = \ln(x, y)$

$(x) - (y) > \emptyset$

$x > y$

3.10.

$\frac{\partial}{\partial x} x^2 + xy^3 = 2x + y^3$

3.11.

$f(x, y) = x^2 y^2 + 10$

$f'_x = 2xy^2$

$f'_y = 2x^2 y$

$f'(0, y) = 2 \cdot 0 \cdot y^2 = 0$

$f'(x, 0) = 2x^2 \cdot 0 = 0$

local min for every x or $y = 0$

3.12.

max $x^2 y^2$ $x + y = 10$

$2xy^2 - c = 0$

$2x^2 y - c = 0$

$x = y$

$x + y = 10$

$x = y$

$x = y = 5$

4.1.

$$\begin{bmatrix} 1 & 1 & 7 \\ 2 & 8 & 2 \end{bmatrix}$$

$$\begin{bmatrix} 2 & 6 \\ 5 & 1 \\ 1 & 9 \end{bmatrix} \begin{matrix} 14 & 50 & 23 \\ 7 & 13 & 37 \\ 19 & 73 & 25 \end{matrix}$$

4.2.

$$\begin{bmatrix} 2 & 2 \\ 4 & 6 \\ 1 & 3 \end{bmatrix}$$

$$\begin{bmatrix} 1 & 9 & 1 \\ 2 & 1 & 2 \end{bmatrix} \begin{matrix} 39 & 59 \\ 10 & 16 \end{matrix}$$

4.3

$$\begin{bmatrix} 7.1 & 2 & 4 \\ 9.1 & 7.8 & 1.1 \\ 4 & 4.44 & \emptyset \end{bmatrix}$$

4.4.

$$\det \begin{bmatrix} 1 & 9 \\ 2 & 8 \end{bmatrix} = -10$$

5.1.

d_1 / d_2	1	2	3	4	5	6
1	11	12	13	14	15	16
2	21	22	23	24	25	26
3	31	32	33	34	35	36
4	41	42	43	44	45	46
5	51	52	53	54	55	56
6	61	62	63	64	65	66

5.2.

user \ Test	+	−
(1%) +	99%	1%
(99%) −	0,5%	99,5%

$\Sigma_1 = 1\% \cdot 99\% + 99\% \cdot 0{,}5\% =$
$= 1{,}485\%$

5.3.

user \ Test	+	−
+	0,99	0,01
−	$99 \cdot 0{,}005$	$99 \cdot 0{,}995$
	0,495	98,505

$$\frac{0{,}99}{0{,}99 + 0{,}495} = \frac{2}{3}$$