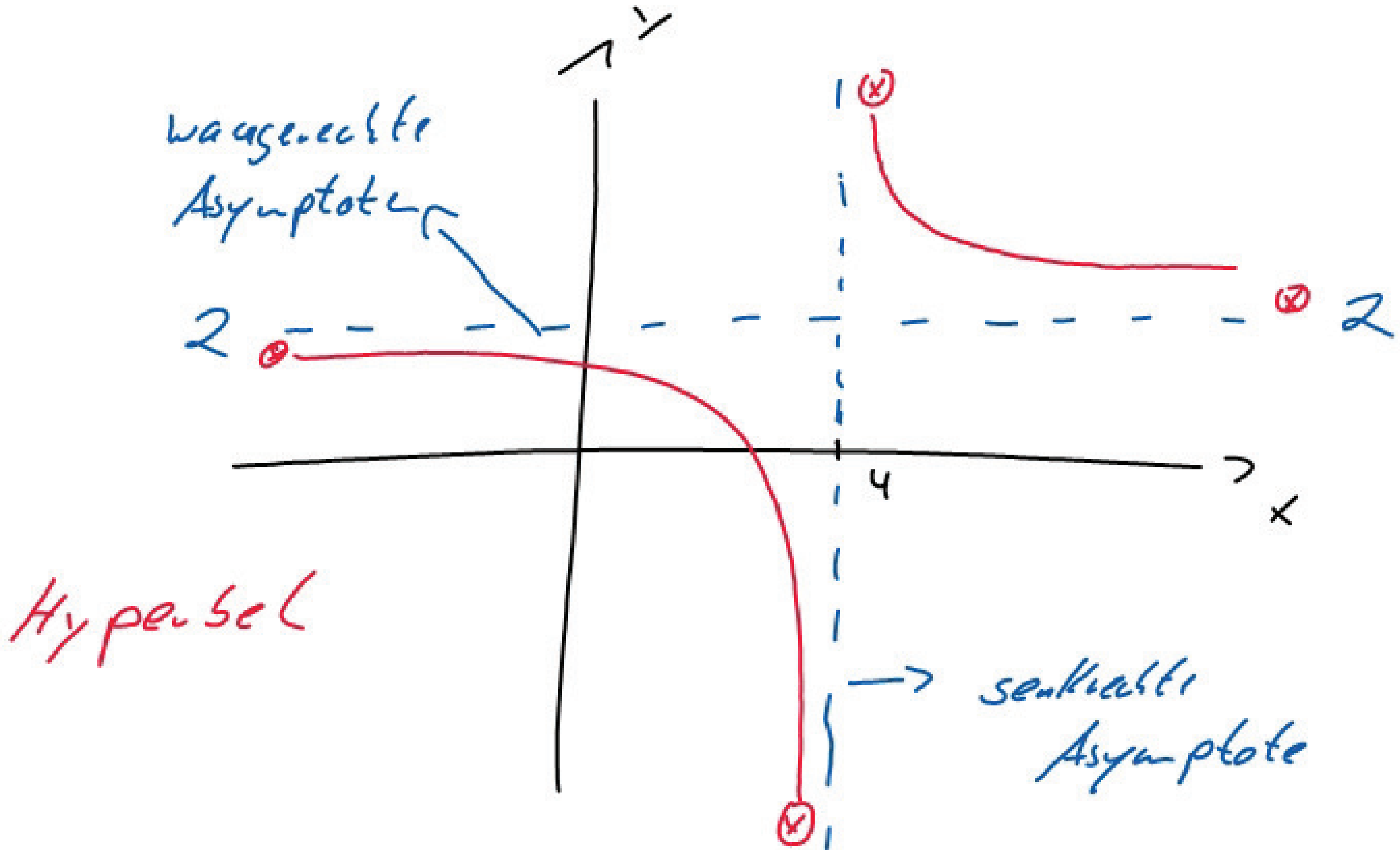
$$f(x) = \frac{3}{x-4} + 2 \qquad \mathbb{D} = \mathbb{R} \setminus \{4\} \qquad \mathbb{W} = ?$$

$$\lim_{x \to -\infty} f(x) = \left[\frac{3}{-\infty} + 2\right] = \left[0^- + 2\right] = 2^- \approx 1{,}9999\ldots$$

$$\lim_{x \to \infty} f(x) = \left[\frac{3}{\infty} + 2\right] - \left[0^+ + 2\right] = 2^+ \approx 2{,}000\ldots1$$

$$\lim_{x \to 4^-} f(x) = \left[\frac{3}{0^-} + 2\right] = -\infty$$

$$\lim_{x \to 4^+} f(x) = \left[\frac{3}{0^+} + 2\right] = \infty$$



$$\mathbb{W} = \mathbb{R} \setminus \{2\}$$

a) $4x^2 - 0{,}4xy + 0{,}01y^2$

b) $a^2x^2 + 6axy + 9y^2$

c) $4x^2 - \frac{1}{4}x^2y^2$

d) $4c^2d^2 - 2 \cdot cd \cdot \frac{3}{c} \cdot d \cdot 2 + \frac{9}{c^2}d^2$

$4c^2d^2 - 12d^2 + 9 \cdot \frac{d^2}{c^2}$

e) $\frac{x^2}{16} + x^2y + 4x^2y^2$

f) $\frac{1}{9}x^2 - \frac{1}{100}y^2$

g) $\overset{-4}{\widetilde{4i^2}} - 20i + 25$

$21 - 20i$

h) $0{,}16i^2 + 6{,}4i + 64$

$63{,}84 + 6{,}4i$

i) $-\frac{1}{16} - 0{,}04x^2$

$(\frac{1}{3}x + 2y)$

1) $3 \cdot (2y + \frac{1}{3}x)(\frac{1}{3}x - 2y) - 4 \cdot (\frac{2}{y}x + 3y)^2$

$3 \cdot (-4y^2 + \frac{1}{9}x^2) - 4 \cdot [4 \cdot \frac{x^2}{y^2} + 12x + 9y^2]$

$-12y^2 + \frac{1}{3}x^2 - 16\frac{x^2}{y^2} - 48x - 36y^2$

$\frac{1}{3}x^2 - 48y^2 - 16\frac{x^2}{y^2} - 48x$

2) $(3b - ab)(3b + ab) - (a - 2b)^2$

$9b^2 - a^2b^2 - [a^2 - 4ab + 4b^2]$

$\underline{9b^2} - a^2b^2 - a^2 + 4ab - \underline{4b^2}$

$5b^2 - a^2b^2 + 4ab - a^2$

3)

$$\frac{3\sqrt{x}+2}{1+\sqrt{3x}} \cdot \frac{1-\sqrt{3x}}{1-\sqrt{3x}} = \frac{3\sqrt{x} - 3\sqrt{x}\cdot\sqrt{3x} + 2 - 2\sqrt{3x}}{1-3x}$$

$\sqrt{3^2}\cdot\sqrt{3}\cdot\sqrt{x^2}$

$$\frac{3\sqrt{x} - \boxed{3\sqrt{3\cdot x^2}} + 2 - \sqrt{12x}}{1-3x}$$

$\sqrt{27}\cdot x$

4)

$$\frac{\sqrt{x}-2\cdot\sqrt{1-x}}{2\sqrt{3x}-4} \quad \frac{2\sqrt{3x}+4}{2\sqrt{3x}+4}$$

$$\frac{2\cdot\sqrt{3}\cdot x + 4\sqrt{x} - 4\cdot\sqrt{3x-3x^2} - 8\cdot\sqrt{1-x}}{12x-16}$$

5) $\lim\limits_{x \to -3} \dfrac{2x+6}{6-2\sqrt{3-2x}} = \left[\dfrac{0}{0}\right] \Rightarrow (x+3)$

$$\frac{2\cdot(\cancel{x+3})}{6-2\sqrt{3-2x}} \cdot \frac{6+2\sqrt{3-2x}}{6+2\sqrt{3-2x}}$$

$$36-4\cdot(3-2x)$$

$$36-12+8x$$

$$24+8x$$

$$8(x+3)$$

$$\lim_{x \to -3} \frac{2\cdot(6+2\sqrt{3-2x})}{8} = \frac{24}{8} = 3$$

$$\lim_{x\to 6}\left(\frac{x^2-4x-12}{2\cdot\sqrt{2x+4}-8}\right) \quad \to \quad (x-6)(x+2) \qquad \text{Vieta}$$

$$\frac{(x-6)\cdot(x+2)\cdot\left(2\sqrt{2x+4}+8\right)}{4\cdot(2x+4)-64}$$

$$8x+16-64$$

$$8x-48$$

$$8\cdot(x-6)$$

$$\lim_{x\to 6}\frac{(x+2)\left(2\sqrt{2x+4}+8\right)}{8} = 16$$

$$(\boxed{2x}\,\underline{-y})^4 = (2x-y)^2\,(2x-y)^2$$

$$(4x^2 - 4xy + y^2)(4x^2 - 4xy + y^2)$$

0						1					
1					1		1				
2				1		2		1			
3			1		3		3		1		
4 =>		1		4		6		4		1	
5	1		5		10		10		5		1

$1+1$, $1+2$

$$1\,(2x)^4(-y)^0 + 4\,(2x)^3(-y)^1 + 6\,(2x)^2(-y)^2 + 4\,(2x)^1(-y)^3 + 1\,(2x)^0(-y)^4$$

$$16x^4 - 32x^3y + 24x^2y^2 - 8xy^3 + y^4$$

3) $\left(2x^2 - \frac{1}{2x}\right)^4$

$$1\,(2x^2)^4\left(-\frac{1}{2x}\right)^0 + 4\,(2x^2)^3\left(-\frac{1}{2x}\right)^1 + 6\,(2x^2)^2\left(-\frac{1}{2x}\right)^2 + 4\,(2x^2)^1\left(-\frac{1}{2x}\right)^3 + 1\,(2x^2)^0\left(-\frac{1}{2x}\right)^4$$

$$16x^8 - 16x^5 + 6x^2 - \frac{1}{x} + \frac{1}{16x^4}$$

$$- \frac{1-16x^3}{16x^4} = \left[\frac{1}{16x^4} - \frac{1}{x}\right]$$

5) $z = (2i - 1/2)^4$

$$1\,(2i)^4(-1/2)^0 + 4\,(2i)^3(-1/2)^1 + 6\,(2i)^2(-1/2)^2 + 4\,(2i)^1(-1/2)^3 + 1\,(2i)^0(-1/2)^4$$

$$16 \quad + 16i \quad - 6 \quad - i \quad + 1/16$$

$$10\,1/16 + 15i$$

$$(a+b)^2 = 1\,a^2b^0 + 2\,a^1b^1 + 1\,a^0b^2$$

$$a^2 + 2ab + b^2$$