1) 2. $(2x - \frac{1}{2}y)^5$

2. $\left(1(2x)^5 \cdot 1 + 5(2x)^4\left(-\frac{1}{2}y\right) + 10(2x)^3\left(-\frac{1}{2}y\right)^2 + 10(2x)^2\left(-\frac{1}{2}y\right)^3 + 5(2x)\left(-\frac{1}{2}y\right)^4 + 1 \cdot 1\left(-\frac{1}{2}y\right)^5\right)$

7. $\left(32x^5 - 40x^4y + 20x^3y^2 - 5x^2y^3 + \frac{5}{8}xy^4 - \frac{1}{32}y^5\right)$

$64x^5 - 80x^4y + 40x^3y^2 - 10x^2y^3 + \frac{5}{4}xy^4 - \frac{1}{16}y^5$

2) $(3i - 2)^4$

$1(3i)^4 \cdot 1 + 4(3i)^3(-2) + 6(3i)^2(-2)^2 + 4(3i)(-2)^3 + 1 \cdot 1(-2)^4$

$81 + 216i - 216 - 96i + 16$

$-119 + 120i$

$(i+3)^2 = -1 + 6i + 9 = 8 + 6i$

$(1 - 2i)^4 = 1 \cdot 1 \cdot 1 + 4 \cdot 1 \cdot (-2i) + 6 \cdot 1 \cdot (-2i)^2 + 4 \cdot 1 \cdot (-2i)^3 + 1 \cdot 1 \cdot (-2i)^4$

$1 - 8i - 24 + 32i + 16$

$-7 + 24i$

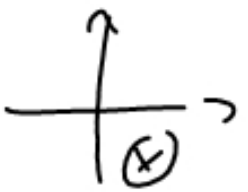
$\Rightarrow -119 + 120i - 2 \cdot (8 + 6i) \cdot (-7 + 24i)$

$- 4 \cdot (4 + 3i) \cdot (-7 + 24i)$

$- 4 \cdot [-28 + 96i - 21i - 72]$

$- 4 \cdot (-100 + 75i)$

$-119 + 120i + 400 - 300i$



$281 - 180i \rightarrow +2\pi$

3)

$$f(x) = \frac{9 - 3x}{2 \cdot \sqrt{2x+3} - 3 \cdot \sqrt{4x-8}}$$

$\rightarrow D = \mathbb{R}^{\geq 2} \setminus \{3\}$

$\rightarrow$ Grenzwerte

$2x+3 = 0 \iff x = -3/2$

$x = 0 : 2 \cdot 0 + 3 > 0 \Rightarrow x \geq -3/2$

$x = -50 : 2 \cdot (-50) + 3 < 0$

$4x - 8 = 0 \iff x = 2$

$x = 10 : 4 \cdot 10 - 8 > 0 \Rightarrow x \geq 2$

$x = 0 : 4 \cdot 0 - 8 < 0$

$\Rightarrow \quad x \geq 2$

$$2 \cdot \sqrt{2x+3} - 3 \cdot \sqrt{4x-8} = 0 \qquad | + 3 \cdot \sqrt{4x-8}$$

$$2 \cdot \sqrt{2x+3} = 3 \cdot \sqrt{4x-8} \qquad | \uparrow^2$$

$$4 \cdot (2x+3) = 9 \cdot (4x-8) \qquad | \cdot$$

$$8x + 12 = 36x - 72 \qquad | -8x + 72$$

$$84 = 28x \qquad | : 28$$

$$3 = x$$

$\lim_{x \to 3} f(x) = \frac{0}{0}$ $\quad \rightarrow \quad (x-3)$

NR:

$$\frac{3 \cdot (3-x)}{2 \cdot \sqrt{2x+3} - 3 \cdot \sqrt{4x-8}} \cdot \frac{2\sqrt{2x+3} + 3 \cdot \sqrt{4x-8}}{2 \cdot \sqrt{2x+3} + 3 \cdot \sqrt{4x-8}}$$

$-3 \cdot (x-3)$

$$\frac{3 \cdot (3-x) \cdot \left(2\sqrt{2x+3} + 3 \cdot \sqrt{4x-8}\right)}{4 \cdot (2x+3) - 9 \cdot (4x-8)}$$

$$8x + 17 - 36x + 72$$

$$-28x + 84$$

$$-28(x-3)$$

$$\lim_{x \to 3} \frac{-3 \cdot \left(2\sqrt{2x+3} + 3 \cdot \sqrt{4x-8}\right)}{-28} = \frac{-6}{-7} = \frac{6}{7}$$