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

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

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

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

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

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

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

$-119 + 120i$

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

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

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

$$-7 + 24i$$

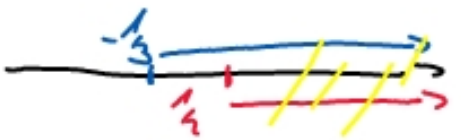
$$-119 + 120i - 2 \cdot (8 + 6i) \cdot (-7 + 24i)$$
$$-4 \cdot (4 + 3i)(-7 + 24i)$$
$$-4 \cdot (-28 + 96i - 21i - 72)$$
$$-4 \cdot (-100 + 75i)$$

$$-119 + 120i + 400 - 300i = 281 - 180i$$

b) $f(x) = \dfrac{4x - 20}{2 \cdot \sqrt{3x+1} - 4 \cdot \sqrt{2x-1}}$ $\quad D = \mathbb{R}^{\geq 1/2} \setminus \{1\}$

$3x + 1 = 0 \iff x = -\frac{1}{3}$ : $3 \cdot 0 + 1 > 0 \Rightarrow x \geq -\frac{1}{3}$, $3 \cdot (-10) + 1 < 0$

$2x - 1 = 0 \iff x = \frac{1}{2}$ : $2 \cdot 10 - 1 > 0 \Rightarrow x \geq \frac{1}{2}$, $2 \cdot 0 - 1 < 0$




$2 \cdot \sqrt{3x+1} - 4 \cdot \sqrt{2x-1} = 0 \quad | + 4 \cdot \sqrt{2x-1}$

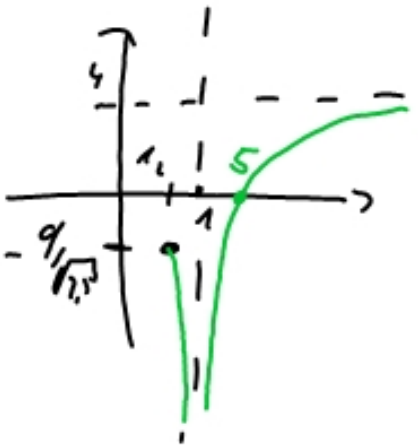
$2 \cdot \sqrt{3x+1} = 4 \cdot \sqrt{2x-1} \quad | ^2$

$4 \cdot (3x+1) = 16(2x-1) \quad | \top$

$12x + 4 = 32x - 16 \quad | + 16 - 12x$

$20 = 20x$

$x = 1$




$\lim\limits_{x \to 1/2^+} f(x) = \dfrac{2 - 20}{2 \cdot \sqrt{2,5} + 0} = -\dfrac{9}{\sqrt{2,5}}$

$\lim\limits_{x \to 1} f(x) = \dfrac{-16}{4 - 4} = \dfrac{-16}{0} \to -\infty$