1) $f: \quad y = \d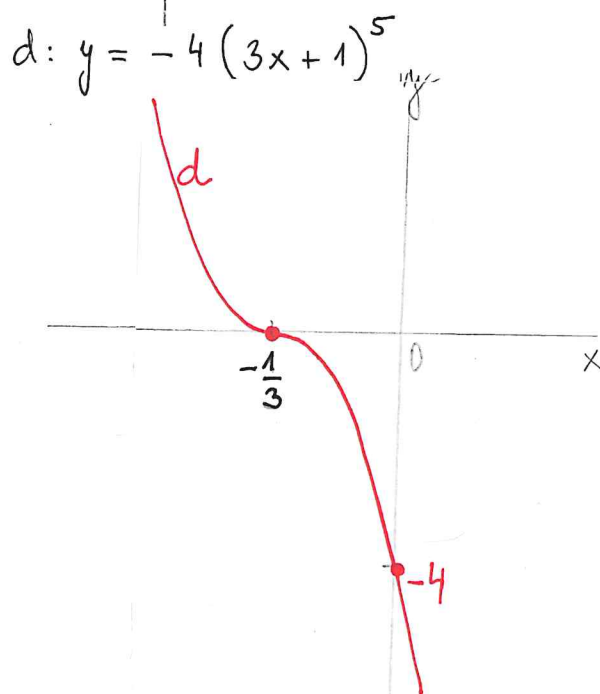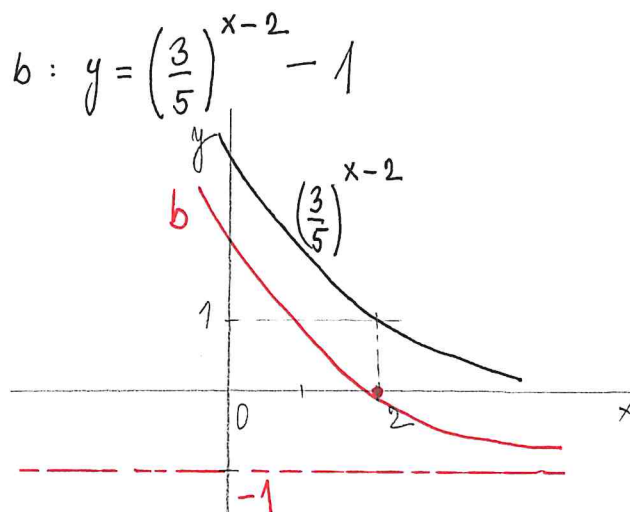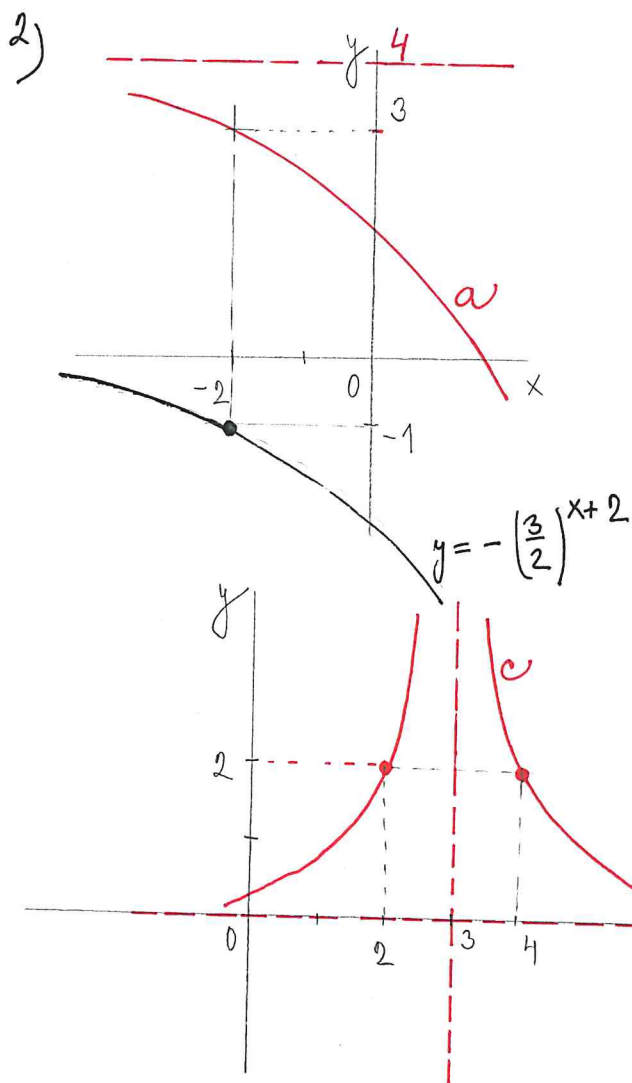frac{-2x+3}{5-3x} = \dfrac{1}{9x-15} + \dfrac{2}{3} \quad \longrightarrow \quad \boxed{H_f = \mathbb{R} - \left\{ \dfrac{2}{3} \right\}}$

$(-2x+3):(-3x+5) = \dfrac{2}{3} - \dfrac{\frac{1}{3}}{-3x+5} = \dfrac{2}{3} + \dfrac{1}{9x-15}$

$-\left(-2x + \dfrac{10}{3}\right)$

$\qquad -\dfrac{1}{3}$

2)

$y = -\left(\dfrac{3}{2}\right)^{x+2}$

$b: \quad y = \left(\dfrac{3}{5}\right)^{x-2} - 1$

$d: \quad y = -4(3x+1)^5$

3) a) $\pi^{x^2+7} = \pi^{2(x+3)}$

$x^2 + 7 = 2x + 6$

$x^2 - 2x + 1 = 0$

$(x-1)^2 = 0$

$\boxed{x = 1}$

b) $\left(\frac{3}{4}\right)^{3x-2} \cdot \left(\frac{3}{4}\right)^{-2(x+1)} = \left(\frac{3}{4}\right)^{-5x-4}$

$$3x - 2 - 2x - 2 = -5x - 4$$
$$6x = 0$$
$$\boxed{x = 0}$$

c) $3^{\frac{4x+4}{x}} = 3^{2x+6} \qquad x \in N !$

$$4x + 4 = 2x^2 + 6x$$
$$2x^2 + 2x - 4 = 0$$
$$x^2 + x - 2 = 0$$
$$x_{1,2} = \frac{-1 \pm \sqrt{1+8}}{2} = \frac{-1 \pm 3}{2} = \begin{cases} 1 \\ -2 \notin N \end{cases} \qquad \boxed{x = 1}$$

d) $2^{3 \cdot \sqrt{3x-8}} \cdot 2^4 = 2^{5 \cdot \sqrt{3x-8}}$

$$3\sqrt{3x-8} + 4 = 5\sqrt{3x-8}$$
$$4 = 2\sqrt{3x-8}$$
$$2 = \sqrt{3x-8}$$
$$4 = 3x - 8$$
$$\boxed{x = 4}$$

podm.: $3x - 8 \geq 0$
$$\underline{\underline{x \geq \frac{8}{3}}}$$

Zk.: $L(4) = 2^{3 \cdot 2} \cdot 2^4 = \underline{\underline{2^{10}}}$

$P(4) = 2^{5 \cdot 2} = \underline{\underline{2^{10}}}$

e) $2^x \left(\underbrace{3 \cdot 2 - 2^2 - 2^{-1}}_{\frac{3}{2}} \right) = 48$

$$2^x = 48 \cdot \frac{2}{3}$$
$$2^x = 32$$
$$\boxed{x = 5}$$

f) $4 \cdot 2^x - 4 \cdot 3^x = 5 \cdot 3^x$
$$4 \cdot 2^x = 9 \cdot 3^x$$

$$2^{2+x} = 3^{2+x} \longrightarrow \left(\frac{2}{3}\right)^{2+x} = 1 \longrightarrow 2+x = 0 \longrightarrow \boxed{x = -2}$$

g) $4^x \cdot 4^2 - 2 \cdot 4^x \cdot 4 + 4^x = 3^x \cdot 3^2 + 3^x \cdot 3 + 4 \cdot 3^x$

$\quad 4^x(16 - 8 + 1) = 3^x(9 + 3 + 4)$

$\quad\quad 4^x \cdot 9 \quad = 3^x \cdot 16$

$$\left(\frac{4}{3}\right)^x = \frac{16}{9}$$

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

$$\boxed{x = 2}$$