

VZOROVKA B

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11 René

1. a) $f_1: y = \sqrt{\log_{\frac{1}{2}}(x^2+5)}$

$$\log_{\frac{1}{2}}(x^2+5) \geq 0$$

$$\log_{\frac{1}{2}}(x^2+5) \geq \log_{\frac{1}{2}}1$$

$$x^2+5 \leq 1$$

$$x^2 \leq 1-5$$

$$x^2 \leq -4$$

$$D_{f_1} = \emptyset$$

NELZE, protože x^2 bude vždy kladná hodnota nebo 0
(nikdy ale nedosáhne velikosti menší než -4)

b) $f_2: y = \log \frac{1-x}{3x-x^2}$

$$1-x > 0$$

$$-x > -1$$

$$\boxed{x > 1}$$

$$3x-x^2 > 0$$

$$x \cdot (3-x) > 0$$

$$\begin{array}{c} \downarrow \\ \boxed{x > 0} \end{array} \quad \begin{array}{c} \downarrow \\ 3-x > 0 \end{array}$$

$$-x > -3$$

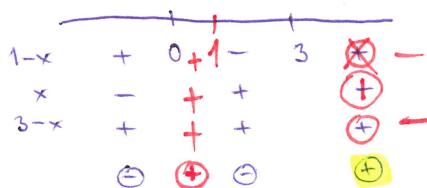
$$\boxed{x > 3}$$

$$\frac{1-x}{3x-x^2} > 0$$

$$1-x > 0$$

$$-x > -1$$

$$\boxed{x > 1}$$



$$D_{f_2} = (-\infty, 1) \cup (0, 3)$$

2.

$$5 \cdot 2^{x+2} - 6 \cdot 3^{x+2} = 3^{x+3} + 2 \cdot 2^{x+1}$$

$$5 \cdot 2^x \cdot 2^2 - 6 \cdot 3^x \cdot 3^2 = 3^x \cdot 3^3 + 2 \cdot 2^x \cdot 2^1$$

$$2^x \cdot 20 - 3^x \cdot 54 = 3^x \cdot 27 + 2^x \cdot 4$$

$$2^x \cdot 20 - 2^x \cdot 4 = 3^x \cdot 54 + 3^x \cdot 27$$

$$2^x \cdot 16 = 3^x \cdot 81 \quad | : 3^x \cdot 16$$

$$\frac{2^x}{3^x} = \frac{81}{16}$$

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

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

$$x = -4$$

$$K = \{-4\}$$

$$x^{-2 + \log_2 x} = 8$$

~~$$x^{-2 + \log_2 x}$$~~

$$\begin{array}{l} x > 0 \\ D_x = \mathbb{R}^+ \end{array}$$

$$\log_2(x^{-2 + \log_2 x}) = \log_2 8$$

$$(-2 + \log_2 x) - (\log_2 x) = \log_2(2^3)$$

$$-2\log_2 x + \log_2 x \cdot \log_2 x = 3$$

$$-2\log_2 x + \log_2^2 x = 3$$

$$\boxed{\log_2 x = t}$$

$$-2t + t^2 = 3$$

$$\underline{t^2 - 2t - 3 = 0}$$

$$t_{1,2} = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$t_{1,2} = \frac{2 \pm \sqrt{(-2)^2 - 4 \cdot 1 \cdot (-3)}}{2 \cdot 1}$$

$$t_{1,2} = \frac{2 \pm 4}{2}$$

$$\boxed{t_1 = 3}$$

$$\boxed{t_2 = -1}$$

$$t_1 = 3 \quad \log_2(x) = 3 \quad \boxed{x_1 = 8} \in D$$

$$t_2 = -1 \quad \log_2(x) = -1 \quad \boxed{x_2 = \frac{1}{2}} \in D$$

$$K = \left\{ \frac{1}{2}, 8 \right\}$$

4.

$$g: y = \left(\frac{1}{2}\right)^{-x+1} - 4$$

P_x $0 = \left(\frac{1}{2}\right)^{-x+1} - 4$

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

$$-2^{-x+1} = -2^2 \quad | \cdot (-1)$$

$$2^{x-1} = 2^2$$

$$x-1 = 2$$

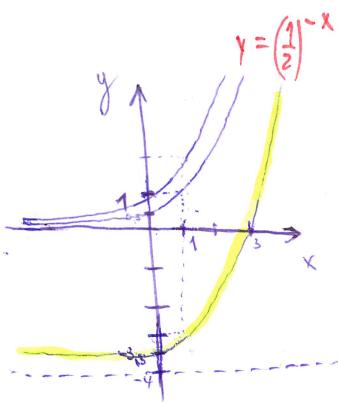
$$x = 2+1$$

$x = 3$

P_y $y = \left(\frac{1}{2}\right)^{0+1} - 4$

$$y = \left(\frac{1}{2}\right)^1 - 4$$

$y = -3,5$



$x = 0$	$y = 1$
$x = 1$	$y = 2$

$x = 0$	$y = 3,5$
$x = 1$	$y = -3$

$D_g = \mathbb{R}$

$H_g = (-4; \infty)$

P_x [3; 0]

P_y [0, -3,5]

asymptota $y = -4$... $y = (-4)$

rostovat $(-\infty; \infty)$

min: nema'

max: nema'

omezeno: shora ne zdroba ano } nem' omezena

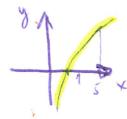
am' suda'

am' lida'

je prosta'

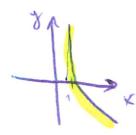
5.

a) $\log_{1,5} x < \log_{1,5} 5$



$x \in (0, 5)$

b) $\log_{0,7}(x+1) \leq \log_{0,7} \frac{1}{3}$



$x \in (-\frac{2}{3}, \infty)$

DPKUD VYPLVNVLQ

TOTO tislo?

6.

$$A [1; 15]$$

$$B [-2; 1]$$

$$y = 2^{x+a} + b$$

$$15 = 2^{1+a} + b$$

$$1 = 2^{-2+a} + b \Rightarrow b = 1 - 2^{-2+a}$$

$$15 = 2^{1+a} + 1 - 2^{-2+a}$$

$$14 = 2^1 \cdot 2^a - 2^{-2} \cdot 2^a$$

$$14 = 2^a \cdot (2^1 - 2^{-2})$$

$$14 = 2^a \cdot \left(2 - \frac{1}{2^2}\right)$$

$$14 = 2^a \cdot \left(\frac{8-1}{4}\right)$$

$$14 = 2^a \cdot \frac{7}{4} \quad | :7$$

$$2 = 2^a \cdot \frac{1}{4}$$

$$2 = 2^a \cdot \frac{1}{2^2} \quad | \cdot 2^2$$

$$2 \cdot 2^2 = 2^a$$

$$2^3 = 2^a$$

$$\boxed{a=3}$$

$$b = 1 - 2^{-2+3}$$

$$b = 1 - 2^{-2} \cdot 2^3$$

$$\boxed{b = -1}$$

$$\frac{\sqrt[3]{x \cdot \sqrt{b^2 \cdot x}}}{x^{-2}} \cdot \frac{b^{-4} \cdot \sqrt{x}}{\sqrt[3]{b^2}} =$$

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

$$= \frac{x^{\frac{1}{3}} \cdot b^{-\frac{2}{6} + \frac{1}{6}} \cdot x^{\frac{1}{6}}}{x^{-\frac{2}{3}}} \cdot \frac{b^{-4} \cdot x^{\frac{1}{2}}}{b^{\frac{2}{3}}} =$$

$$= \frac{x^{\frac{1}{3}} \cdot b^{-\frac{1}{3}} \cdot x^{\frac{1}{6}}}{x^{-\frac{2}{3}}} \cdot \frac{b^{-4} \cdot x^{\frac{1}{2}}}{b^{\frac{2}{3}}} =$$

$$= \frac{x^{\frac{1}{3}} \cdot x^{\frac{1}{6}} \cdot x^{\frac{1}{2}} \cdot b^{-\frac{1}{3}} \cdot b^{-\frac{4}{3}}}{x^{-\frac{2}{3}} \cdot b^{\frac{2}{3}}} =$$

$$= \frac{x^1 \cdot b^{-\frac{13}{3}}}{x^{-\frac{2}{3}} \cdot b^{\frac{2}{3}}} =$$

$$= x^{\frac{5}{3}} \cdot b^{-5} =$$

$$= \sqrt[3]{x^5} \cdot \frac{1}{b^5} =$$

$$= \frac{\sqrt[3]{x^5}}{b^5} = \frac{\sqrt[3]{x^2}}{b^5}$$

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$x > 0$
$b > 0$