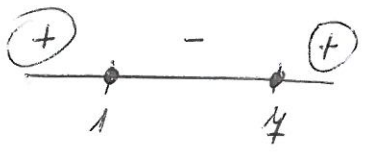
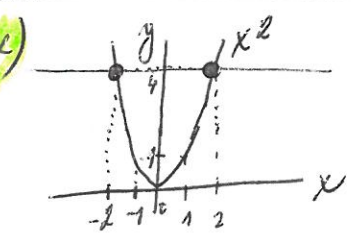


VZOR 1

1) $x^2 - 5x + 4 \geq 0$
 $(x-1)(x-4) \geq 0$



$x \in \{1, 4, 8, 9, \dots\}$



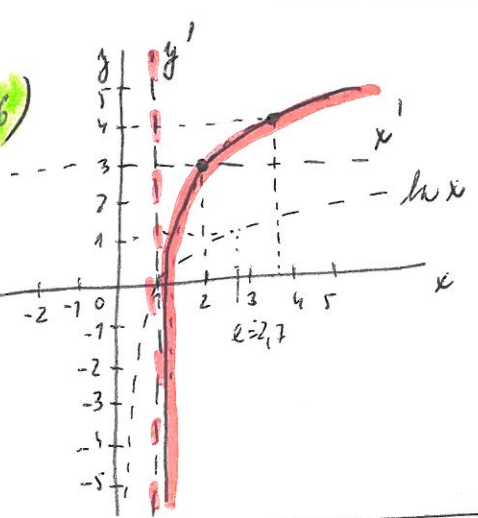
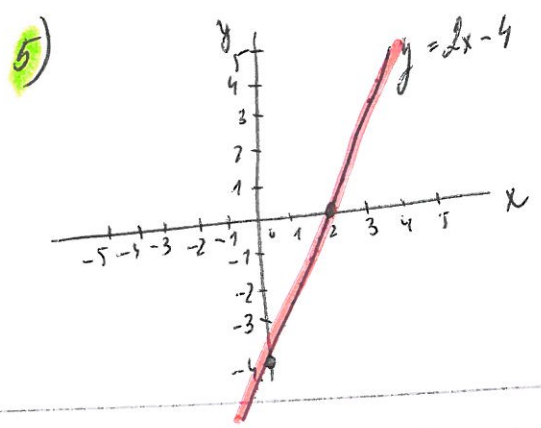
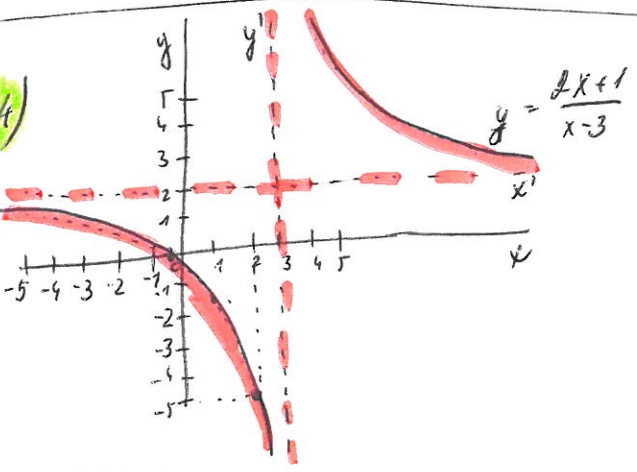
$f(2) = 4 = f(-2)$

• pro dvě různé x -ové hodnoty je jedno stejné y
 $f(2) = 4$
 $f(-2) = 4$

\Rightarrow **NENÍ**
PROSTÁ

3) $\frac{\sqrt[4]{a^3}}{a} \cdot \sqrt{\frac{a \cdot \sqrt[3]{a^4}}{a^k}} = a$
 $\frac{a^{\frac{3}{4}}}{a^1} \cdot \sqrt{\frac{a^{\frac{4}{3}}}{a^k}} = a$
 $a^{\frac{3}{4}-1} \cdot a^{\frac{2}{3}-\frac{k}{2}} = a$
 $a^{-\frac{1}{4}} \cdot a^{\frac{4-3k}{6}} = a$
 $a^{-\frac{1}{4} + \frac{4-3k}{6}} = a$
 $-\frac{1}{4} + \frac{4-3k}{6} = 1$
 $\frac{4-3k}{6} = \frac{5}{2}$
 $4-3k = 15$
 $-3k = 11$
 $k = -\frac{11}{3}$

$\frac{1}{\sqrt[12]{a}}$



4) $\frac{a+b}{a^k} \cdot \frac{(a+b)^x}{a^k} = \frac{1}{\frac{a^k}{a^k}} = 1$
 podmínky: $x \neq 0; y \neq 0$

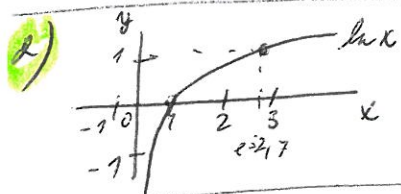
8) $\left(\frac{x^2}{y^2} + \frac{y}{x}\right) \cdot \left(\frac{x}{y^2} - \frac{1}{y} + \frac{1}{x}\right) = \frac{x^3 + y^3}{xy^2} \cdot \frac{x^2 - xy + y^2}{xy^2} = \frac{(x+y)(x^2 - xy + y^2)}{xy^2} \cdot \frac{xy^2}{x^2 - xy + y^2} = x+y$

9) $\sin\left(x - \frac{\pi}{2}\right) = \frac{1}{2}$
 $x - \frac{\pi}{2} = \frac{\pi}{6} + 2k\pi$
 $x_1 = \frac{2}{3}\pi + 2k\pi$
 $x - \frac{\pi}{2} = \frac{5}{6}\pi + 2k\pi$
 $x_2 = \frac{4}{3}\pi + 2k\pi$
 $k \in \mathbb{Z}$

10) $\ln x^2 - 3 \ln \sqrt[3]{x} + 2 \ln x^3 = 14$
 $2 \ln x - 3 \cdot \frac{1}{3} \ln x + 6 \ln x = 14$
 $4 \ln x = 14$
 $\ln x = \frac{7}{2}$
 $x = e^{\frac{7}{2}}$
 $\exists k: L = \ln e^4 - 3 \ln \sqrt[3]{e^2} + 2 \ln e^6 = 4 - 2 + 12 = 14$
 $P = 14$
 $L = P$

VZOR 2

1) $2x^2 - 6x + 4 = 2(x^2 - 3x + 2) = 2(x-1)(x-2)$

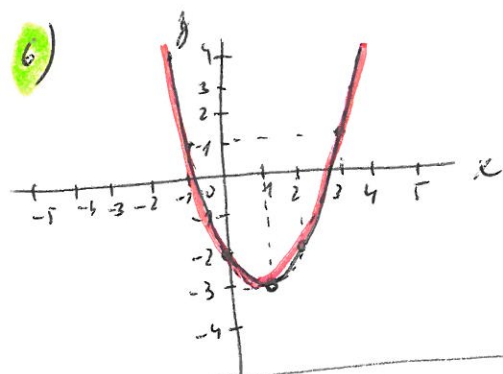
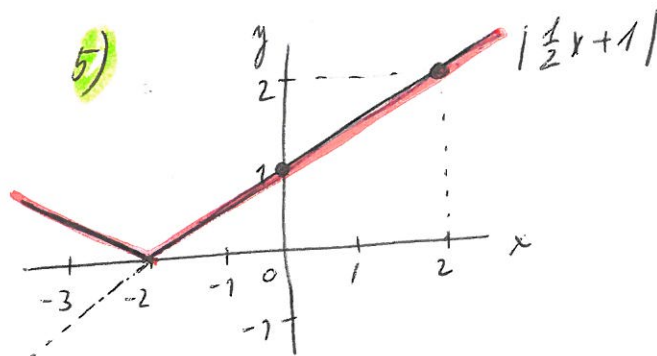
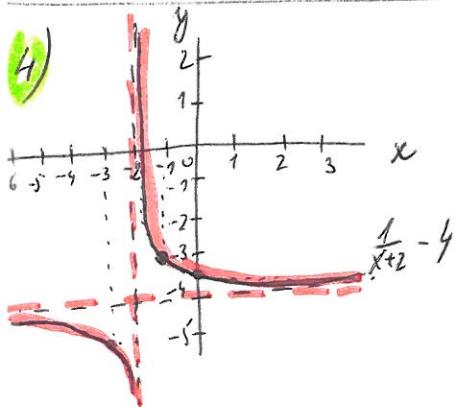


s rostoucím x roste i jeho funkční hodnota $f(x)$
FUNKCE JE ROSTOUCÍ

3) $\frac{\sqrt[3]{x^2 \cdot \sqrt{x^3}}}{\sqrt{x} \cdot \sqrt[4]{x^2}} = \frac{\sqrt[3]{x^2 \cdot x^{\frac{3}{2}}}}{x \cdot x^{\frac{1}{2}} \cdot x^{\frac{5}{4}}} = x$

$\frac{2}{3} + \frac{3}{2 \cdot 3} - \frac{1}{3} - \frac{1}{6} - \frac{5}{12} = \frac{8+6-4-2-5}{12} = \frac{3}{12} = \frac{1}{4}$

$x = x = x = \sqrt[4]{x}$



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

podmínky: $y \neq 0; y \neq -1$

8) $\frac{2a-1}{2a} - \frac{2a}{2a-1} - \frac{1}{2a-4a^2} = \frac{(2a-1)^2 - 4a^2 + 1}{2a(2a-1)} = \frac{4a^2 - 4a + 1 - 4a^2 + 1}{2a(2a-1)} = \frac{2-4a}{2a(2a-1)} = \frac{1-2a}{a(2a-1)}$

$= -\frac{1}{a}$

podmínky: $a \neq 0; a \neq \frac{1}{2}$

9) $3^3 \cdot 27^{2x-3} = 81^{3x-5}$

$3^3 \cdot 3^{3(2x-3)} = 3^{4(3x-5)}$

$3+6x-9 = 12x-20$

$3 = 3$

$3+6x-9 = 12x-20$

$-6x = -14$

$x = \frac{4}{3}$

10) $\cos(2x + \pi) = \frac{\sqrt{2}}{2}$

$2x + \pi = \frac{\pi}{4} + 2k\pi \rightarrow 2x + \pi = -\frac{\pi}{4} + 2k\pi$

$2x = -\frac{3}{4}\pi + 2k\pi$

$2x = -\frac{5}{4}\pi + 2k\pi$

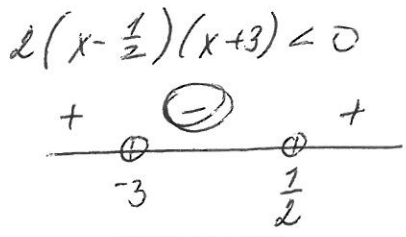
$x_1 = -\frac{3}{8}\pi + k\pi$

$x_2 = -\frac{5}{8}\pi + k\pi$

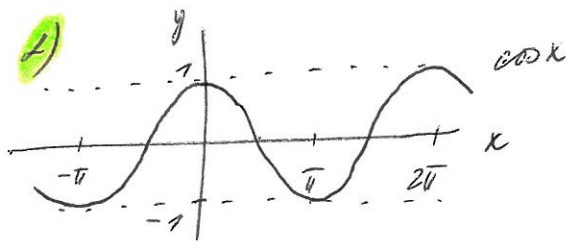
$k \in \mathbb{Z}$

VĚROU 3

1) $2x^2 + 5x - 3 < 0$
 $x_{1/2} = \frac{-5 \pm \sqrt{25 + 24}}{4} = \frac{-5 \pm 7}{4} \rightarrow \frac{1}{2}, -3$

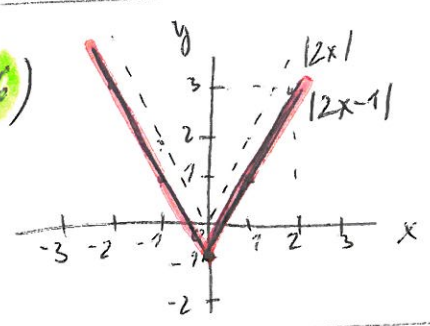
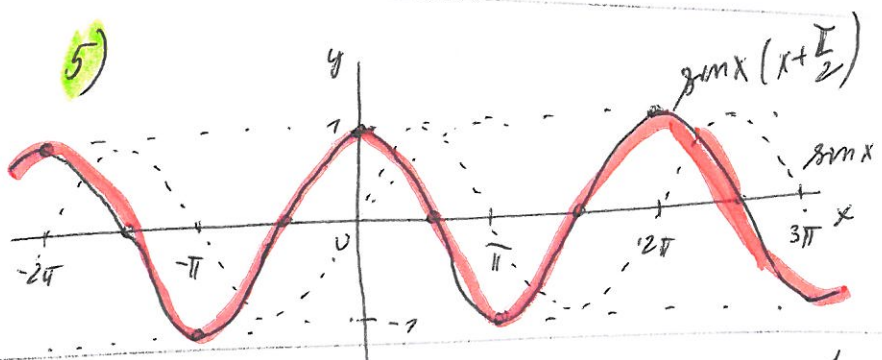
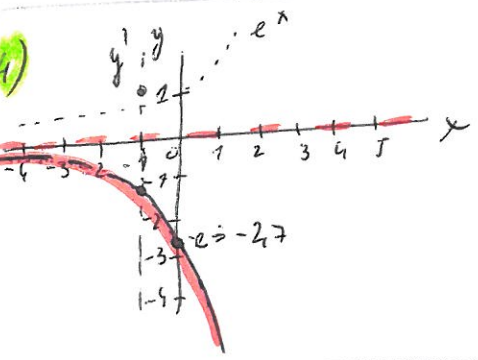


$x \in (-3; \frac{1}{2})$



symetrická podle osy y
FUNKCE JE SUDÁ

3) $t^2 \cdot \sqrt{\frac{t \cdot \sqrt{t^4}}{3\sqrt{t^2} \cdot 6\sqrt{t}}} = t^{2 + \frac{1}{2} + \frac{4}{2} - \frac{2}{2} - \frac{1}{2}} = t^{\frac{24+6+12-4-1}{12}} = t^{\frac{37}{12}} = t^{3\frac{1}{12}} = \sqrt[12]{t^{37}}$



4) $1 + \frac{1}{2 + \frac{1}{3 + \frac{1}{x}}} = 1 + \frac{1}{2 + \frac{1}{\frac{3x+1}{x}}} = 1 + \frac{1}{2 + \frac{x}{3x+1}} = 1 + \frac{1}{\frac{6x+2+x}{3x+1}} = 1 + \frac{3x+1}{4x+2} = \frac{4x+2+3x+1}{4x+2} = \frac{7x+3}{4x+2}$

podm: $x \neq 0, x \neq -\frac{1}{3}, x \neq -\frac{2}{4}$

7) $(\frac{x-1}{x-2} - \frac{x}{x-1})(x - \frac{3x}{x+1}) = \frac{x^2-2x+1 - x^2+2x}{(x-2)(x-1)} \cdot \frac{x^2+x-3x}{x+1} = \frac{1}{(x-2)(x-1)} \cdot \frac{x^2-2x}{x+1} = \frac{x(x-2)}{(x-2)(x-1)(x+1)} = \frac{x}{x^2-1}$

podm: $x \neq \pm 1, x \neq 2$

8) $\log x (8 - \log x) = 15 \quad | \log x = A$
 $A(8-A) = 15$
 $8A - A^2 = 15$
 $A^2 - 8A + 15 = 0$
 $(A-5)(A-3) = 0$
 $A = 5 \rightarrow \log x = 5 \rightarrow x = 10^5$
 $A = 3 \rightarrow \log x = 3 \rightarrow x = 10^3$

$26: \frac{1}{4} = \log 10^5 (8 - \log 10^5) = 5 \cdot 3 = 15$
 $P_1 = 15 \quad L_1 = P_1$
 $L_2 = \log 10^3 (8 - \log 10^3) = 3 \cdot 5 = 15$
 $P_2 = 15 \quad L_2 = P_2$

10) $25^{2x} - 3 \cdot 25^x = 10 \quad | 25^x = A$
 $A^2 - 3A - 10 = 0$
 $(A-5)(A+2) = 0$
 $A = 5 \rightarrow 25^x = 5 \rightarrow 5^{2x} = 5^1 \rightarrow x = \frac{1}{2}$
 $A = -2 \rightarrow 25^x = -2$ nelze