1. Řeš rovnice:

a) $x^4-3x^2-18=0$ b) $4x^4-9x^2+2=0$ c) $4y^4-12y^2+9=0$

d) $2y^4+4y^2+1=0$ e) $z^4-\frac{10}{3}z^2+1=0$ f) $3z^4-11z^2-4=0$

2. Řeš rovnice:

a) $\left(x^2-x\right)^2-x^2+x-30=0$ b) $\left(u^2+2u\right)^2-7u^2-14u-8=0$

3. Řeš rovnice:

a) $\left(\frac{x}{x+2}\right)^2-\frac{x}{x+2}-6=0$ b) $\left(\frac{2}{3u-1}\right)^2+\frac{6}{3u-1}+4=0$

c) $3\left(\frac{1}{v^2}\right)^2-\frac{2}{v^2}-1=0$ d) $\left(\frac{x^2+1}{x}\right)^2+\frac{x^2+1}{x}-12=0$

4. Řešte rovnice:

a) $\sqrt{x^2+x+13}-\sqrt{x^2+x+4}=\sqrt{x^2+x-11}$

b) $\sqrt{y^2-3y+3}+\sqrt{y^2-3y+6}=\sqrt{y^2-3y+11}$

5. Řešte rovnice:

a) $\frac{2x}{x+4}+1=\frac{x+4}{x}$ b) $\frac{1}{x-3}+\frac{x-3}{4}=-1$ c) $\sqrt{\frac{2a}{a+1}}+\sqrt{\frac{a+1}{2a}}=2$

d) $3\sqrt{\frac{b-2}{b-1}}+2\sqrt{\frac{b-1}{b-2}}+4=0$

6. Řešte rovnice:

a) $3\left(2y+4\right)^2-2\sqrt{3}\left|2y+4\right|+1=0$ b) $\left(x-\frac{1}{2}\right)^2-2\left|x-\frac{1}{2}\right|+5=0$

c) $\left(z^2-z\right)^2-8\left|z^2-z\right|-4=0$ d) $\left(4-x^2\right)^2-8\left|4-x^2\right|+7=0$

7. Řeš nerovnice:

a) $4u^4-12u^2+9\le 0$ b) $2\left(v+5\right)^2+3\left|v+5\right|-2\ge 0$

c) $\frac{1-x}{x}+\sqrt{\frac{1-x}{x}}+2<0$ d) $\left(\frac{3}{2x-1}\right)^2-\frac{18}{2x-1}+8>0$

8. Řešte soustavy rovnic:

a) $\begin{aligned}\frac{4}{x+2y}-\frac{1}{x-2y}&=1\\ \frac{20}{x+2y}+\frac{3}{x-2y}&=1\end{aligned}$ b) $\begin{aligned}\frac{3}{x+2}+\frac{4}{y+1}&=-8\\ \frac{5}{x+2}-\frac{3}{y+1}&=6\end{aligned}$

c) $\begin{aligned} u+4v^2&=1\\ u^2-v^2&=1\end{aligned}$ d) $\begin{aligned} 2u^2-v^2&=-14\\ 3u^2+v^2&=19\end{aligned}$

e) $\begin{aligned} \sqrt{x+y}-\sqrt{x-y}&=4\\ \sqrt{x-y}+\sqrt{x+y}&=14\end{aligned}$ f) $\begin{aligned} \sqrt{\frac{2x}{x+y}}+\sqrt{\frac{x+y}{2x}}&=2\\ 2x\left(x+y\right)&=144\end{aligned}$

9. Řešte rovnici: $3x+4\sqrt{x^2-3x}=x^2+4$

Řešení:

1. a) $-\sqrt{6},\sqrt{6}$ b) $-\sqrt{2},-\frac{1}{2},\frac{1}{2},\sqrt{2}$ c) $-\frac{1}{2}\sqrt{6},\frac{1}{2}\sqrt{6}$ d)NŘ
   e) $-\sqrt{3},-\frac{1}{3}\sqrt{3},\frac{1}{3}\sqrt{3},\sqrt{3}$ f) $-2,2$

2. a) $-2,3$ b) $-4,-1,2$
3. a) $-3,-\frac{4}{3}$ b)NŘ c) $-1,1$ d) $-2-\sqrt{3},-2+\sqrt{3},\frac{3}{2}-\frac{1}{2}\sqrt{5},\frac{3}{2}+\frac{1}{2}\sqrt{5}$
4. a) $-4,3$ b) $1,2$
5. a) $-2,4$ b) 1 c) 1 d)NŘ
6. a) $-2-\frac{1}{6}\sqrt{3},-2+\frac{1}{6}\sqrt{3}$ b)NŘ c) $\frac{1}{2}-\frac{1}{2}\sqrt{17},\frac{1}{2}+\frac{1}{2}\sqrt{17}$
   d) $-\sqrt{11},-\sqrt{5},-\sqrt{3},\sqrt{3},\sqrt{5},\sqrt{11}$
7. a) $-\frac{1}{2}\sqrt{6},\frac{1}{2}\sqrt{6}$ b) $(-\infty,-\frac{11}{2}>\cup<-\frac{9}{2},\infty)$ c)NŘ d) $(-\infty,\frac{1}{2})\cup(\frac{1}{2},\frac{7}{8})\cup(\frac{5}{4},+\infty)$
8. a) $\left(3,\frac{5}{2}\right)$ b)NŘ c) $\left(1,0\right)\left(-\frac{5}{4},-\frac{3}{4}\right)\left(-\frac{5}{4},\frac{3}{4}\right)$ d) $\left(-1,-4\right)\left(-1,4\right)\left(1,-4\right)\left(1,4\right)$ e) $\left(53,28\right)$
   f) $\left(-6,-6\right)\left(6,6\right)$
9. $\left(-1,4\right)$