Makrá:

```
\def\rbsmall{\footnotesize}

\newcommand\tg{\mathop{\rm tg}\nolimits}
\newcommand\cotg{\mathop{\rm cotg}\nolimits}
\newcommand\arctg{\mathop{\rm arctg}\nolimits}
\newcommand\arccotg{\mathop{\rm arccotg}\nolimits}

\newcommand\ee{\mathop{\rm e}\nolimits}
\newcommand\ii{\mathop{\smash{\rm i}}\nolimits}
\newcommand\prvyindent{\hangafter=-1\hangindent=\parindent}

\definecolor{RedViolet}{cmyk}{0.07,0.90,0,0.34}
\definecolor{Mahogany}{cmyk}{0,0.85,0.87,0.35}
\definecolor{BurntOrange}{cmyk}{0,0.51,1,0}
\newcommand\cervena{\color{red!80!black}}\newcommand\cierna{\color{black}}
\newcommand\zelena{\color{green!60!black}}\newcommand\modra{\color{blue!80!black}}
\newcommand\zlta{\color{yellow!95!black}}\newcommand\oranzova{\color{BurntOrange!50!red}}
\newcommand\hneda{\color{Mahogany}}\newcommand\fialova{\color{RedViolet}}
\newcommand\biela{\color{white}}\newcommand\krvava{\color{red}}

%..................................................................... makra pre FP vypocty
%
\newcommand\rbPr[3][4]{\FPeval{\rbV}{clip(round(#3,#1))}\FPset{#2}{\rbV}}%
\newcommand\rb[2][4]{\FPeval{\rbV}{clip(round(#2,#1))}\rbV}%
\newcommand\rbx[2][4]{\FPeval{\rbV}{clip(round(#2,#1))}}%

\newcommand\rbAbs[2][4]{\FPeval{\rbV}{clip(abs(round(#2,#1)))}\rbV}%
\newcommand\rbSignum[2][4]{\FPeval{\rbV}{clip(round(#2,#1))}\FPifneg\rbV-\else\fi}%
\newcommand\rbJ[2][4]{\FPeval{\rbV}{clip(round(#2,#1))}%
      \FPeval{\rbVa}{clip(abs(round(#2,#1)))}%
      \FPifneg\rbV-\else\fi\FPifeq1\rbVa\else\rbVa\fi}%
\newcommand\rbPMO[2][4]{\FPeval{\rbV}{clip(round(#2,#1))}%
  \FPeval{\rbVa}{clip(abs(round(#2,#1)))}\ifthenelse{\equal{\rbV}{0}}{}{\FPifneg\rbV-\else+\fi\rbVa}}%

\newcommand\testO[3]{\rbx{#1}\FPifzero{\rbV}#2\else#3\fi}%
\newcommand\testP[3]{\rbx{#1}\FPifpos{\rbV}#2\else#3\fi}%
\newcommand\testI[3]{\rbx{#1}\FPifint{\rbV}#2\else#3\fi}%

\newcommand\testujO[2][\rrT]{\rbx{#2}\FPifzero{\rbV}\FPset{#1}{1}\else\FPset{#1}{0}\fi}%
\newcommand\testujI[2][\rrT]{\rbx{#2}\FPifint{\rbV}\FPset{#1}{1}\else\FPset{#1}{0}\fi}%
\newcommand\testujP[2][\rrT]{\rbx{#2}\FPifpos{\rbV}\FPset{#1}{1}\else\FPset{#1}{0}\fi}%
\newcommand\testujM[2][\rrT]{\rbx{#2}\FPifneg{\rbV}\FPset{#1}{1}\else\FPset{#1}{0}\fi}%

\newcommand\rbZlomokCelyHJ[3]{\testDeli[#2]{#1}{\rbJ{(#1)/(#2)}#3}{%
                           \rbSignum{(#1)*(#2)}\frac{\rbJ{abs(#1)}#3}{\rbAbs{#2}}}}%
\newcommand\rbZlomokCelyHOJ[3]{\rbPr{\rbV}{#1}%
  \ifthenelse{\equal{\rbV}{0}}{}{\testDeli[#2]{#1}{\rbJ{(#1)/(#2)}#3}{%
                           \rbSignum{(#1)*(#2)}\frac{\rbJ{abs(#1)}#3}{\rbAbs{#2}}}}}%

\newcommand\testDeli[4][2]{%
\testujI[\trrI]{#1}\testujI[\trrII]{#2}\testujO[\trxII]{#2}%
\ifthenelse{\trrI=1 \and \trrII=1 \or \trxII=1}{\rbPr{\rrX}{#1}%
                    \ifthenelse{\equal{\rrX}{0}}{{\color{red}menovatel=0}}{%
                              \FPeval{\rrV}{trunc(abs(#2)/abs(#1),0)}%
                              \FPeval{\rrW}{trunc((abs(#2)+abs(#1)-1)/abs(#1),0)}%
                    \ifthenelse{\rrV=\rrW \or \trxII=1}{#3}{#4}}}{#4}}%

%.....................................................................................
\def\rbput[#1,#2]#3{\rbPr{\rbbAx}{#1}\rbPr{\rbbAy}{#2}\put(\rbbAx,\rbbAy){#3}}
\def\rbmultiput[#1,#2][#3,#4]#5#6{\rbPr{\rbbAx}{#1}\rbPr{\rbbAy}{#2}%
    \rbPr{\rbbBx}{#3}\rbPr{\rbbBy}{#4}\rbPr{\rbbPx}{#5}%
    \multiput(\rbbAx,\rbbAy)(\rbbBx,\rbbBy){\rbbPx}{#6}}
%.....................................................................................
\def\rbline[#1,#2]#3{\rbPr{\rbcAx}{#1}\rbPr{\rbcAy}{#2}\line(\rbcAx,\rbcAy){#3}}
\def\rbvector[#1,#2]#3{\rbPr{\rbcAx}{#1}\rbPr{\rbcAy}{#2}\vector(\rbcAx,\rbcAy){#3}}
%.....................................................................................
\def\rbcircle#1{\rbPr{\rbcPx}{#1}\circle{\rbcPx}}
\def\rbCircle*#1{\rbPr{\rbcPx}{#1}\circle*{\rbcPx}}
%.....................................................................................
\def\rbbigcircle#1{\rbPr{\rbcPx}{#1}\bigcircle{\rbcPx}}
\def\rbarc[#1,#2]#3{\rbPr{\rbcAx}{#1}\rbPr{\rbcAy}{#2}\arc(\rbcAx,\rbcAy){#3}}




% E: x^2/A+y^2/B=1, p: y=sx/q+r,  mierka=#1, rovnobezna/kolma=#2 [r resp. R/ine]
%    A=#3, B=#4, A>0, B>0,        s=#5, q=#6, r=#7, q<>0
%.....................................................................
```

```
\newcommand\prH[7][0.055mm]{\def\ZLE{{\cervena\bf BAD:}\
  mierka=[#1], rovnobezna/kolma=#2, $A=#3$, $B=#4$, $s=#5$,
  $q=#6$, $r=#7$\qquad {\cervena\bf$\Rightarrow$\ OK:}\quad
  $\frac{x^2}{A}+\frac{y^2}{B}=1$, $y=\frac{s}{q}x+r$, $A>0$, $B>0$, $q\ne0$}%
\testujM[\rii]{-(#3)}\testujM[\riii]{-(#4)}\testujO[\rv]{#6}%
\ifthenelse{\rii=0 \or \riii=0 \or \rv=1}{\ZLE}{Nájdite dotyčnicu
  k\testO{(#3)-(#4)}{u~kružnici}{~elipse}~%
  $\rbZlomokCelyHJ{1}{#3}{x^2}+\rbZlomokCelyHJ{1}{#4}{y^2}=1$
  \ifthenelse{\equal{#2}{r} \or \equal{#2}{R}}{rovnobežná s~priamkou}{kolmá na~priamku}~%
  $p:y=\rbZlomokCelyHOJ{#5}{#6}{x}\testO{#5}{\rb{#7}}{\rbPMO{#7}}$.}}



%.....................................................................
\newcommand\prHobr[7][0.055mm]{\def\ZLE{{\cervena\bf BAD:}\
  mierka=[#1], rovnobezna/kolma=#2, $A=#3$, $B=#4$, $s=#5$,
  $q=#6$, $r=#7$\qquad {\cervena\bf$\Rightarrow$\ OK:}\quad
  $\frac{x^2}{A}+\frac{y^2}{B}=1$, $y=\frac{s}{q}x+r$, $A>0$, $B>0$, $q\ne0$}%
\testujM[\rii]{-(#3)}\testujM[\riii]{-(#4)}\testujO[\rv]{#6}%
\ifthenelse{\rii=0 \or \riii=0 \or \rv=1}{\ZLE}{%
\ifthenelse{\equal{#2}{r} \or \equal{#2}{R}}{\rbPr{\ri}{1}}{\rbPr{\ri}{0}}%
\setlength{\unitlength}{#1}\rbPr{\bbPD}{(#5)/(#6)}\rbPr{\bbPDt}{arctan(\bbPD)}%
\ifthenelse{\ri=1}{\def\rbCit{#5}\def\rbMen{#6}\def\bbMPi{-1}}{\def\rbCit{#6}%
\def\rbMen{#5}\def\bbMPi{1}}%
\testO{#5}{\rbPr{\bbPN}{0}}{\rbPr{\bbPN}{(#6)/(#5)}}%
\rbPr{\rbS}{(#3)*(\rbCit)*(\rbCit)+(#4)*(\rbMen)*(\rbMen)}%
\rbPr{\bbP}{root(2,(#4)/(#3))}\testujP[\bbPi]{1-(\bbP)}%
\testI{root(2,(#3))}{\rbPr{\bbA}{root(2,(#3))}}{\def\bbA{\sqrt{\rb{#3}}}}%
\testI{root(2,(#4))}{\rbPr{\bbB}{root(2,(#4))}}{\def\bbB{\sqrt{\rb{#4}}}}%
\ifthenelse{\bbPi=1}{%rozmery obrazku
 \def\bbRx{500}\def\bbElx{400}\rbPr{\bbEly}{(\bbElx)*(\bbP)}\rbPr{\bbRy}{(\bbEly)+(100)}}{%
 \def\bbRy{500}\def\bbEly{400}\rbPr{\bbElx}{(\bbEly)/(\bbP)}\rbPr{\bbRx}{(\bbElx)+(100)}}%
\rbPr{\ppP}{(\bbElx)/root(2,#3)/2}\rbPr{\ppX}{(#7)*(\ppP)}%
%%%priamka
\rbPr{\ppLx}{-(\bbRx)/2}\rbPr{\ppLy}{-(\bbPD)*(\bbRx)/2+(\ppX)}%
\rbPr{\ppPx}{(\bbRx)/2}\rbPr{\ppPy}{(\bbPD)*(\bbRx)/2+(\ppX)}%
\testO{#5}{\rbPr{\ppLy}{max(-(\bbRy)/2-10,min(\ppX,(\bbRy)/2+10))}\rbPr{\ppPy}{\ppLy}}{%
 \testP{\ppLy-(\bbRy)/2}{\rbPr{\ppLy}{(\bbRy)/2}\rbPr{\ppLx}{(\bbPN)*((\ppLy)-(\ppX))}}{}%
 \testP{-(\ppLy)-(\bbRy)/2}{\rbPr{\ppLy}{-(\bbRy)/2}\rbPr{\ppLx}{(\bbPN)*((\ppLy)-(\ppX))}}{}%
 \testP{\ppPy-(\bbRy)/2}{\rbPr{\ppPy}{(\bbRy)/2}\rbPr{\ppPx}{(\bbPN)*((\ppPy)-(\ppX))}}{}%
 \testP{-(\ppPy)-(\bbRy)/2}{\rbPr{\ppPy}{-(\bbRy)/2}\rbPr{\ppPx}{(\bbPN)*((\ppPy)-(\ppX))}}{}}%
%%%dotycnice
\rbPr{\bbDx}{(#3)*(\rbCit)/root(2,\rbS)*(\ppP)}%
\rbPr{\bbDy}{(\bbMPi)*(#4)*(\rbMen)/root(2,\rbS)*(\ppP)}%
\ifthenelse{\ri=1}{%
 \rbPr{\bbDLxi}{(\bbDx)+100*cos(\bbPDt)}\rbPr{\bbDLyi}{(\bbDy)+100*sin(\bbPDt)}%
  \rbPr{\bbDPxi}{(\bbDx)-100*cos(\bbPDt)}\rbPr{\bbDPyi}{(\bbDy)-100*sin(\bbPDt)}}{%
 \rbPr{\bbDLxi}{(\bbDx)+100*sin(\bbPDt)}\rbPr{\bbDLyi}{(\bbDy)-100*cos(\bbPDt)}%
  \rbPr{\bbDPxi}{(\bbDx)-100*sin(\bbPDt)}\rbPr{\bbDPyi}{(\bbDy)+100*cos(\bbPDt)}}%
\rbPr{\bbDLxii}{-(\bbDLxi)}\rbPr{\bbDLyii}{-(\bbDLyi)}%
\rbPr{\bbDPxii}{-(\bbDPxi)}\rbPr{\bbDPyii}{-(\bbDPyi)}%
\testP{\bbDx}{\def\LPi{l}\def\LPii{r}}{\def\LPi{r}\def\LPii{l}}%
\testP{\bbDy}{\def\DHi{b}\def\DHii{t}}{\def\DHi{t}\def\DHii{b}}%
%
\begin{picture}(\bbRx,\bbRy)
\rbput[0,(\bbRy)/2]{\line(1,0){\bbRx}}\rbput[(\bbRx)/2,0]{\line(0,1){\bbRy}}
\rbput[(\bbRx)/2-10,(\bbRy)/2-10]{\makebox(0,0)[rt]{{\tiny$0$}}}%
\modra\renewcommand{\yscale}{\bbP}\rbput[(\bbRx)/2,(\bbRy)/2]{\bigcircle{\bbElx}}%
\renewcommand{\yscale}{1}%
\fialova\rbput[(\bbRx)/2,(\bbRy)/2]{\curve(\ppLx,\ppLy,\ppPx,\ppPy)}
\biela\linethickness{.4em}
\rbput[(\bbRx)/2+(\ppLx),(\bbRy)/2+(\ppLy)+5]{\bigcircle{6}}
\fialova\rbput[(\bbRx)/2+(\ppLx),(\bbRy)/2+(\ppLy)]{\makebox(0,0)[c]{{\scriptsize $p$}}}
\cervena\thicklines
\rbput[(\bbRx)/2+(\bbDx),(\bbRy)/2+(\bbDy)]{\circle*{10}}
\rbput[(\bbRx)/2+(\bbDx)+sgn(\bbDx)*10,(\bbRy)/2+(\bbDy)+sgn(\bbDy)*10]{%
\makebox(0,0)[\LPi\DHi]{{\scriptsize $D_1$}}}
\rbput[(\bbRx)/2-(\bbDx),(\bbRy)/2-(\bbDy)]{\circle*{10}}
\rbput[(\bbRx)/2-(\bbDx)-sgn(\bbDx)*10,(\bbRy)/2-(\bbDy)-sgn(\bbDy)*10]{%
\makebox(0,0)[\LPii\DHii]{{\scriptsize $D_2$}}}
\rbput[(\bbRx)/2,(\bbRy)/2]{\curve(\bbDLxi,\bbDLyi,\bbDPxi,\bbDPyi)}
\rbput[(\bbRx)/2,(\bbRy)/2]{\curve(\bbDLxii,\bbDLyii,\bbDPxii,\bbDPyii)}
\biela\linethickness{.4em}
\rbput[(\bbRx)/2+(\bbElx)/2+23,(\bbRy)/2]{\bigcircle{6}}
\linethickness{.5em}\renewcommand{\xscale}{.1}
\rbput[(\bbRx)/2,(\bbRy)/2+(\bbEly)/2+28]{\bigcircle{12}}
\modra\renewcommand{\xscale}{1}
\rbput[(\bbRx)/2+(\bbElx)/2+23,(\bbRy)/2]{\makebox(0,0)[c]{{\scriptsize$a$}}}
\rbput[(\bbRx)/2,(\bbRy)/2+(\bbEly)/2+10]{\makebox(0,0)[b]{{\scriptsize$b$}}}
\modra\rbput[(\bbRx)/2,-10]{\makebox(0,0)[t]{{\scriptsize$b\!=\!\bbB$ \enspace $a\!=\!\bbA$}}}
\end{picture}}}
```

Obrázky:

Príklady nekonečných radov ilustrovaných v geometrii

```
%.....................................................................
\begin{figure}[ht]
\begin{center}
\vspace{-\baselineskip}
\phantom.\hfill
\setlength{\unitlength}{0.04mm}
\begin{picture}(550,550)
\thicklines
\curve(0,0,0,300)\curve(0,0,400,300)\curve(0,300,400,300)
\curve(0,300,144,492)\curve(400,300,144,492)
\curve(144,492,328.32,545.76)\curve(400,300,328.32,545.76)
\curve(328.32,545.76,472.0896,491.6928)\curve(400,300,472.0896,491.6928)
\curve(472.0896,491.6928,538.14989,388.08038)\curve(400,300,538.14989,388.08038)
\curve(538.14989,388.08038,530.69451,290.0595)\curve(400,300,530.69451,290.0595)
\curve(530.69451,290.0595,478.87305,230.90471)\curve(400,300,478.87305,230.90471)
\curve(478.87305,230.90471,417.31301,217.91995)\curve(400,300,417.31301,217.91995)
\curve(417.31301,217.91995,371.6819,239.15853)\curve(400,300,371.6819,239.15853)
\put(0,300){\arc(40,0){-90}}\put(12.5,285.5){\circle*{6}}
\put(144,492){\arc(0,-40){-36.869898}}\put(148,473){\circle*{6}}
\put(144,492){\arc(0,-40){53.130102}}
\put(328.32,545.76){\arc(0,-40){-73.739796}}\put(319,529){\circle*{6}}
\put(328.32,545.76){\arc(0,-40){16.260204}}
\cervena
\put(10,150){\makebox(0,0)[l]{{\scriptsize$a_1$}}}
\put(60,405){\makebox(0,0)[r]{{\scriptsize$a_2$}}}
\put(230,540){\makebox(0,0)[b]{{\scriptsize$a_3$}}}
\put(400,534){\makebox(0,0)[b]{{\scriptsize$a_4$}}}
\put(520,440){\makebox(0,0)[l]{{\scriptsize$a_5$}}}
\put(550,340){\makebox(0,0)[l]{{\scriptsize$a_6$}}}
\modra
\put(210,140){\makebox(0,0)[lt]{{\scriptsize$1$}}}
\put(200,290){\makebox(0,0)[t]{{\scriptsize$b_1$}}}
\put(272,388){\makebox(0,0)[t]{{\scriptsize$b_2$}}}
\put(350,423){\makebox(0,0)[r]{{\scriptsize$b_3$}}}
\end{picture}
%
\hfill
%
\begin{picture}(550,550)
\thicklines
\curve(50,50,550,50)\curve(550,50,300,550)\curve(50,50,300,550)
\cervena\thinlines
\put(300,204.5085){\bigcircle{309.17}}
\put(300,418.03399){\bigcircle{118.03399}}
\put(300,499.59347){\bigcircle{45.08497}}
\put(300,530.74642){\bigcircle{17.220926}}
\modra
\put(45,50){\line(-1,0){30}}\put(295,550){\line(-1,0){280}}
\put(30,300){\vector(0,-1){250}}\put(30,300){\vector(0,1){250}}
\put(40,300){\makebox(0,0)[l]{{\scriptsize$h$}}}
\put(300,45){\line(0,-1){30}}\put(550,45){\line(0,-1){30}}
\put(425,30){\vector(1,0){125}}\put(425,30){\vector(-1,0){125}}
\put(425,20){\makebox(0,0)[t]{{\scriptsize$R$}}}
\linethickness{.1mm}\dottedline{4}(300,50)(300,550)
\end{picture}
%
\hfill
%
\setlength{\unitlength}{0.055mm}
\begin{picture}(1300,400)
%%%%%%%%%%%%%%%%%%%%%%%%
\put(0,0){             %2
\linethickness{.1mm}
\dottedline{4}(200,75)(288.38835,111.61165)\dottedline{4}(288.38835,111.61165)(325,200)
\dottedline{4}(325,200)(288.38835,288.38835)\dottedline{4}(288.38835,288.38835)(200,325)
\dottedline{4}(200,325)(111.61165,288.38835)\dottedline{4}(111.61165,288.38835)(75,200)
\dottedline{4}(75,200)(111.61165,111.61165)\dottedline{4}(111.61165,111.61165)(200,75)
\thicklines
\curve(413.38835,236.61165,325,200)\curve(413.38835,236.61165,288.38835,288.38835)
\curve(325,376.7767,288.38835,288.38835)\curve(325,376.7767,200,325)
\curve(163.38835,413.38835,200,325)\curve(163.38835,413.38835,111.61165,288.38835)
\curve(23.2233,325,111.61165,288.38835)\curve(23.2233,325,75,200)
\curve(-13.38835,163.38835,75,200)\curve(-13.38835,163.38835,111.61165,111.61165)
\curve(75,23.2233,111.61165,111.61165)\curve(75,23.2233,200,75)
\curve(236.61165,-13.38835,200,75)\curve(236.61165,-13.38835,288.38835,111.61165)
\curve(376.7767,75,288.38835,111.61165)\curve(376.7767,75,325,200)
\modra\thinlines\put(200,200){\bigcircle{250}}
}
```

```
%%%%%%%%%%%%%%%%%%%%%%%%
\put(475,0){          %3
\linethickness{.1mm}
\dottedline{4}(200,75)(288.38835,111.61165)\dottedline{4}(288.38835,111.61165)(325,200)
\dottedline{4}(325,200)(288.38835,288.38835)\dottedline{4}(288.38835,288.38835)(200,325)
\dottedline{4}(200,325)(111.61165,288.38835)\dottedline{4}(111.61165,288.38835)(75,200)
\dottedline{4}(75,200)(111.61165,111.61165)\dottedline{4}(111.61165,111.61165)(200,75)
\thicklines
\put(306.694175,244.194175){\arc(18.305825,-44.194175){180}}
\put(93.305825,155.805825){\arc(-18.305825,44.194175){180}}
\put(306.694175,155.805825){\arc(18.305825,44.194175){-180}}
\put(93.305825,244.194175){\arc(-18.305825,-44.194175){-180}}
\put(244.194175,306.694175){\arc(-44.194175,18.305825){-180}}
\put(155.805825,93.305825){\arc(44.194175,-18.305825){-180}}
\put(244.194175,93.305825){\arc(-44.194175,-18.305825){180}}
\put(155.805825,306.694175){\arc(44.194175,18.305825){180}}
\modra\thinlines\put(200,200){\bigcircle{250}}
}
%%%%%%%%%%%%%%%%%%%%%%%%
\put(910,0){        %4
\linethickness{.1mm}
\dottedline{4}(325,200)(288.38835,288.38835)\dottedline{4}(288.38835,288.38835)(200,325)
\dottedline{4}(200,325)(111.61165,288.38835)\dottedline{4}(111.61165,288.38835)(75,200)
\dottedline{4}(75,200)(111.61165,111.61165)\dottedline{4}(111.61165,111.61165)(200,75)
\dottedline{4}(200,75)(288.38835,111.61165)\dottedline{4}(288.38835,111.61165)(325,200)
\thicklines
\curve(383.240730,275.900797,325,200)\curve(383.240730,275.900797,288.38835,288.38835)
\curve(275.900797,383.240730,288.38835,288.38835)\curve(275.900797,383.240730,200,325)
\curve(124.099203,383.240730,200,325)\curve(124.099203,383.240730,111.61165,288.38835)
\curve(16.759270,275.900797,111.61165,288.38835)\curve(16.759270,275.900797,75,200)
\curve(16.759270,124.099203,75,200)\curve(16.759270,124.099203,111.61165,111.61165)
\curve(124.099203,16.759270,111.61165,111.61165)\curve(124.099203,16.759270,200,75)
\curve(275.900797,16.759270,200,75)\curve(275.900797,16.759270,288.38835,111.61165)
\curve(383.240730,124.099203,288.38835,111.61165)\curve(383.240730,124.099203,325,200)
\modra\thinlines\put(200,200){\bigcircle{250}}
}
\end{picture}
\caption{Príklady nekonečných radov ilustrovaných v~geometrii}
\label{picture11}
\end{center}
\end{figure}
```

Stereografická projekcia komplexných čísel a definícia goniometrických funkcií

```
%.....................................................................
\begin{figure}[ht]
\begin{center}
\setlength{\unitlength}{0.08mm}%
\begin{picture}(800,520)
\thinlines
\put(405,300){\line(1,0){280}}\put(395,300){\line(-1,0){240}}
\put(397.764,295.529){\line(-1,-2){120}}\put(402.236,304.471){\line(1,2){75}}
\curve(155,300,166.5485,304.7835)\curve(155,300,166.5485,295.2165)
\curve(685,300,673.4515,295.2165)\curve(685,300,673.4515,304.7835)
\curve(277.7640,55.5290,278.6501,67.9976)\curve(277.7640,55.5290,287.2072,63.7190)
\curve(477.2360,454.4710,476.3499,442.0024)\curve(477.2360,454.4710,467.7928,446.2810)
\curve(0,30,220,470)\curve(800,470,580,30)\curve(0,30,580,30)
\curve(220,470,294.643,470)\curve(505.357,470,800,470)
\put(40,50){\makebox(0,0)[lb]{{\scriptsize$C$}}}
\put(295,65){\makebox(0,0)[l]{{\scriptsize$\Im{ }$}}}
\put(710,310){\makebox(0,0)[br]{{\scriptsize$\Re{ }$}}}
\put(380,290){\makebox(0,0)[rt]{{\scriptsize$0$}}}
\put(710,455){\makebox(0,0)[lt]{{\scriptsize$\infty$}}}
\put(585,290){\makebox(0,0)[tr]{{\scriptsize$1$}}}
\thicklines
\put(202,181){\circle{10}}\put(400,300){\circle{10}}\put(470,250){\circle{10}}
\put(480,250){\makebox(0,0)[l]{{\scriptsize$z_1$}}}
\put(207,171){\makebox(0,0)[lt]{{\scriptsize$z_2$}}}
\thinlines
\put(497,314){\makebox(0,0)[b]{{\scriptsize$a_1$}}}
\put(263.5,314){\makebox(0,0)[b]{{\scriptsize$a_2$}}}
\put(363,260){\makebox(0,0)[r]{{\scriptsize$\ii\!b_1$}}}
\put(350,181){\makebox(0,0)[l]{{\scriptsize$\ii\!b_2$}}}
\dottedline{5}(470,250)(497,304)
\dottedline{5}(470,250)(368,250)
\dottedline{5}(202,181)(263.5,304)
\dottedline{5}(202,181)(343.5,181)
\curve(493,296,497,304)\curve(380,250,368,250)
\curve(259.5,296,263.5,304)\curve(333.5,181,345.5,181)
\cervena\thinlines
\dottedline{3}(400,460)(400,70)\dottedline{3}(400,460)(526,82)
```

```
\dottedline{3}(400,460)(158,119)\dottedline{3}(400,460)(640,268)
\dottedline{3}(400,460)(700,460)
\dottedline{3}(400,70)(395.2165,81.5485)\dottedline{3}(400,70)(404.7835,81.5485)
\dottedline{3}(526,82)(517.8100,91.4432)\dottedline{3}(526,82)(526.8861,94.4686)
\dottedline{3}(158,119)(160.7826,131.1863)\dottedline{3}(158,119)(168.5847,125.6494)
\dottedline{3}(640,268)(627.9939,271.4790)\dottedline{3}(640,268)(633.9704,278.9496)
\dottedline{3}(700,460)(688.4515,455.2165)\dottedline{3}(700,460)(688.4515,464.7835)
\modra
\put(610,310){\makebox(0,0)[bl]{{\scriptsize$k_1$}}}
\put(500,170){\makebox(0,0)[lb]{{\scriptsize$k_{z_1}$}}}
\put(273,264){\makebox(0,0)[lt]{{\scriptsize$k_{z_2}$}}}
\put(268,274){\circle*{10}}\put(498,166){\circle*{10}}
\put(400,460){\circle*{10}}\put(400,470){\makebox(0,0)[b]{{\scriptsize$N$}}}
\put(400,150){\circle*{10}}\put(405,147.5){\makebox(0,0)[l]{{\scriptsize$S\!=\!k_0$}}}
\thicklines
\put(600,300){\circle*{10}}\put(400,300){\arc(200,0){180}}
\curvedashes[2mm]{0,1,.35}\put(400,300){\arc(200,0){-180}}
\renewcommand{\xscale}{1}\renewcommand{\xscaley}{-1}
\renewcommand{\yscale}{.5}\renewcommand{\yscalex}{.5}
\put(400,300){\arc(116.108,-80){180}}
\curvedashes{}\put(400,300){\arc(116.108,-80){-180}}
\end{picture}
%
\quad
%
\setlength{\unitlength}{0.08mm}
\begin{picture}(600,520)
\put(0,30){\thinlines       %3
\put(300,0){\line(0,1){520}}\put(30,250){\line(1,0){540}}
\put(290,500){\makebox(0,0)[r]{{\small$v$}}}
\put(560,240){\makebox(0,0)[t]{{\small$u$}}}
\put(300,250){\line(4,-3){230}}
\put(90,240){\makebox(0,0)[rt]{{\scriptsize $-1$}}}
\put(290,240){\makebox(0,0)[rt]{{\scriptsize $O$}}}
\put(290,40){\makebox(0,0)[rt]{{\scriptsize $-1$}}}
\dottedline{4}(300,250)(20,460)
\oranzova
\thinlines
\put(300,250){\bigcircle{400}}
\cervena
\put(590,0){\makebox(0,0)[rb]{{\footnotesize$x\in(-\frac{\pi}{2},0)$}}}
\put(462,115){\makebox(0,0)[t]{{\scriptsize $A$}}}
\thicklines
\put(300,250){\arc(200,0){-36.8699}}
\put(487.5,200){\makebox(0,0)[r]{{\scriptsize $x$}}}
\thinlines
\put(300,250){\arc(75,0){-36.8699}}
\curve(360,205,362.0643,217.3284)\curve(360,205,370.1771,212.2578)
\modra
\thicklines
\curve(460,250,460,130)\put(450,200){\makebox(0,0)[r]{{\scriptsize $\sin{x}$}}}
\zelena
\thicklines
\curve(300,250,460,250)\put(380,260){\makebox(0,0)[b]{{\scriptsize $\cos{x}$}}}
\fialova
\thicklines
\curve(500,250,500,100)\put(510,175){\makebox(0,0)[l]{{\scriptsize $\tg{x}$}}}
\put(490,85){\makebox(0,0)[t]{{\scriptsize $T$}}}
\hneda
\thicklines
\curve(300,450,33.33333,450)\put(165,460){\makebox(0,0)[b]{{\scriptsize $\cotg{x}$}}}
\put(30,437){\makebox(0,0)[t]{{\scriptsize $C$}}}
\cierna
\put(462,260){\makebox(0,0)[b]{{\scriptsize $A_x$}}}
\put(510,260){\makebox(0,0)[lb]{{\scriptsize $J$}}}
\put(307,460){\makebox(0,0)[lb]{{\scriptsize $K$}}}
}
\end{picture}
\caption{Stereografická projekcia komplexných čísel a definícia goniometrických funkcií}
\label{picture12}
\end{center}
\end{figure}
```

Konštrukcia Peanovej krivky, van Kochovej snehovej vločky a Hilbertovej krivky

```
%.....................................................................
\begin{figure}[ht]
\begin{center}
\setlength{\unitlength}{0.054mm}
\begin{picture}(486,486)
%%%%%%%%%%%%%%%%%%%%
```

```
\cierna
\put(0,0){\thicklines      %4
\put(0,243){\line(1,0){486}}
\put(54,189){\line(1,0){378}}\put(432,189){\line(0,1){108}}\put(432,297){\line(-1,0){378}}\put(54,297){\line(0,-1){108}}
\put(108,135){\line(1,0){270}}\put(378,135){\line(0,1){216}}\put(378,351){\line(-1,0){270}}\put(108,351){\line(0,-1){216}}
\put(162,81){\line(1,0){162}}\put(324,81){\line(0,1){324}}\put(324,405){\line(-1,0){162}}\put(162,405){\line(0,-1){324}}
\put(216,27){\line(1,0){54}}\put(270,27){\line(0,1){432}}\put(270,459){\line(-1,0){54}}\put(216,459){\line(0,-1){432}}
\thinlines
\put(18,225){\line(1,0){450}}\put(468,225){\line(0,1){36}}\put(468,261){\line(-1,0){450}}\put(18,261){\line(0,-1){36}}
\put(36,207){\line(1,0){414}}\put(450,207){\line(0,1){72}}\put(450,279){\line(-1,0){414}}\put(36,279){\line(0,-1){72}}
\put(72,171){\line(1,0){342}}\put(414,171){\line(0,1){144}}\put(414,315){\line(-1,0){342}}\put(72,315){\line(0,-1){144}}
\put(90,153){\line(1,0){306}}\put(396,153){\line(0,1){180}}\put(396,333){\line(-1,0){306}}\put(90,333){\line(0,-1){180}}
\put(126,117){\line(1,0){234}}\put(360,117){\line(0,1){252}}\put(360,369){\line(-1,0){234}}\put(126,369){\line(0,-1){252}}
\put(144,99){\line(1,0){198}}\put(342,99){\line(0,1){288}}\put(342,387){\line(-1,0){198}}\put(144,387){\line(0,-1){288}}
\put(180,63){\line(1,0){126}}\put(306,63){\line(0,1){360}}\put(306,423){\line(-1,0){126}}\put(180,423){\line(0,-1){360}}
\put(198,45){\line(1,0){90}}\put(288,45){\line(0,1){396}}\put(288,441){\line(-1,0){90}}\put(198,441){\line(0,-1){396}}
\put(234,9){\line(1,0){18}}\put(252,9){\line(0,1){468}}\put(252,477){\line(-1,0){18}}\put(234,477){\line(0,-1){468}}
}
\end{picture}
%
\
%
\setlength{\unitlength}{.2mm}
\begin{picture}(160,125)
%%%%%%%%%%%%%%%%%%%
\setlength{\unitlength}{.04mm}
\cierna
\put(312,249){\thicklines       %1
\curve(0,31.176914,108,31.176914)\curve(108,31.176914,54,124.707658)\curve(54,124.707658,0,31.176914)
}
%%%%%%%%%%%%%%%%%%%
\setlength{\unitlength}{.085mm}
\cervena
\put(103,84){\thicklines     %2
\curve(0,31.176914,36,31.176914)\curve(36,31.176914,54,0.000000)\curve(54,0.000000,72,31.176914)
\curve(72,31.176914,108,31.176914)\curve(108,31.176914,90,62.353830)\curve(90,62.353830,108,93.530744)
\curve(108,93.530744,72,93.530744)\curve(72,93.530744,54,124.707658)\curve(54,124.707658,36,93.530744)
\curve(36,93.530744,0,93.530744)\curve(0,93.530744,18,62.353830)\curve(18,62.353830,0,31.176914)
}
%%%%%%%%%%%%%%%%%%%
\setlength{\unitlength}{.135mm}
\cierna
\put(35.5,30){\thicklines     %3
\curve(0,31.176914,12,31.176914)\curve(12,31.176914,18,20.784610)\curve(18,20.784610,24,31.176914)
\curve(24,31.176914,36,31.176914)\curve(36,31.176914,42,20.784610)\curve(42,20.784610,36,10.392304)
\curve(36,10.392304,48,10.392304)\curve(48,10.392304,54,0.000000)\curve(54,0.000000,60,10.392304)
\curve(60,10.392304,72,10.392304)\curve(72,10.392304,66,20.784610)\curve(66,20.784610,72,31.176914)
\curve(72,31.176914,84,31.176914)\curve(84,31.176914,90,20.784610)\curve(90,20.784610,96,31.176914)
\curve(96,31.176914,108,31.176914)\curve(108,31.176914,102,41.569220)\curve(102,41.569220,108,51.961524)
\curve(108,51.961524,96,51.961524)\curve(96,51.961524,90,62.353830)\curve(90,62.353830,96,72.746134)
\curve(96,72.746134,108,72.746134)\curve(108,72.746134,102,83.138438)\curve(102,83.138438,108,93.530744)
\curve(108,93.530744,96,93.530744)\curve(96,93.530744,90,103.923048)\curve(90,103.923048,84,93.530744)
\curve(84,93.530744,72,93.530744)\curve(72,93.530744,66,103.923048)\curve(66,103.923048,72,114.315354)
\curve(72,114.315354,60,114.315354)\curve(60,114.315354,54,124.707658)\curve(54,124.707658,48,114.315354)
\curve(48,114.315354,36,114.315354)\curve(36,114.315354,42,103.923048)\curve(42,103.923048,36,93.530744)
\curve(36,93.530744,24,93.530744)\curve(24,93.530744,18,103.923048)\curve(18,103.923048,12,93.530744)
\curve(12,93.530744,0,93.530744)\curve(0,93.530744,6,83.138438)\curve(6,83.138438,0,72.746134)
\curve(0,72.746134,12,72.746134)\curve(12,72.746134,18,62.353830)\curve(18,62.353830,12,51.961524)
\curve(12,51.961524,0,51.961524)\curve(0,51.961524,6,41.569220)\curve(6,41.569220,0,31.176914)
}
%%%%%%%%%%%%%%%%%%%
\setlength{\unitlength}{.2mm}
\cervena
\put(0,0){\thicklines     %4
\curve(0,31.176914,4,31.176914)\curve(4,31.176914,6,27.712812)\curve(6,27.712812,8,31.176914)
\curve(8,31.176914,12,31.176914)\curve(12,31.176914,14,27.712812)\curve(14,27.712812,12,24.248712)
\curve(12,24.248712,16,24.248712)\curve(16,24.248712,18,20.784610)\curve(18,20.784610,20,24.248712)
\curve(20,24.248712,24,24.248712)\curve(24,24.248712,22,27.712812)\curve(22,27.712812,24,31.176914)
\curve(24,31.176914,28,31.176914)\curve(28,31.176914,30,27.712812)\curve(30,27.712812,32,31.176914)
\curve(32,31.176914,36,31.176914)\curve(36,31.176914,38,27.712812)\curve(38,27.712812,36,24.248712)
\curve(36,24.248712,40,24.248712)\curve(40,24.248712,42,20.784610)\curve(42,20.784610,40,17.320508)
\curve(40,17.320508,36,17.320508)\curve(36,17.320508,38,13.856406)\curve(38,13.856406,36,10.392304)
\curve(36,10.392304,40,10.392304)\curve(40,10.392304,42,6.928204)\curve(42,6.928204,44,10.392304)
\curve(44,10.392304,48,10.392304)\curve(48,10.392304,50,6.928204)\curve(50,6.928204,48,3.464102)
\curve(48,3.464102,52,3.464102)\curve(52,3.464102,54,0.000000)\curve(54,0.000000,56,3.464102)
\curve(56,3.464102,60,3.464102)\curve(60,3.464102,58,6.928204)\curve(58,6.928204,60,10.392304)
\curve(60,10.392304,64,10.392304)\curve(64,10.392304,66,6.928204)\curve(66,6.928204,68,10.392304)
\curve(68,10.392304,72,10.392304)\curve(72,10.392304,70,13.856406)\curve(70,13.856406,72,17.320508)
\curve(72,17.320508,68,17.320508)\curve(68,17.320508,66,20.784610)\curve(66,20.784610,68,24.248712)
\curve(68,24.248712,72,24.248712)\curve(72,24.248712,70,27.712812)\curve(70,27.712812,72,31.176914)
\curve(72,31.176914,76,31.176914)\curve(76,31.176914,78,27.712812)\curve(78,27.712812,80,31.176914)
\curve(80,31.176914,84,31.176914)\curve(84,31.176914,86,27.712812)\curve(86,27.712812,84,24.248712)
```

```
\curve(84,24.248712,88,24.248712)\curve(88,24.248712,90,20.784610)\curve(90,20.784610,92,24.248712)
\curve(92,24.248712,96,24.248712)\curve(96,24.248712,94,27.712812)\curve(94,27.712812,96,31.176914)
\curve(96,31.176914,100,31.176914)\curve(100,31.176914,102,27.712812)\curve(102,27.712812,104,31.176914)
\curve(104,31.176914,108,31.176914)\curve(108,31.176914,106,34.641016)\curve(106,34.641016,108,38.105118)
\curve(108,38.105118,104,38.105118)\curve(104,38.105118,102,41.569220)\curve(102,41.569220,104,45.033320)
\curve(104,45.033320,108,45.033320)\curve(108,45.033320,106,48.497422)\curve(106,48.497422,108,51.961524)
\curve(108,51.961524,104,51.961524)\curve(104,51.961524,102,55.425626)\curve(102,55.425626,100,51.961524)
\curve(100,51.961524,96,51.961524)\curve(96,51.961524,94,55.425626)\curve(94,55.425626,96,58.889728)
\curve(96,58.889728,92,58.889728)\curve(92,58.889728,90,62.353830)\curve(90,62.353830,92,65.817930)
\curve(92,65.817930,96,65.817930)\curve(96,65.817930,94,69.282032)\curve(94,69.282032,96,72.746134)
\curve(96,72.746134,100,72.746134)\curve(100,72.746134,102,69.282032)\curve(102,69.282032,104,72.746134)
\curve(104,72.746134,108,72.746134)\curve(108,72.746134,106,76.210236)\curve(106,76.210236,108,79.674338)
\curve(108,79.674338,104,79.674338)\curve(104,79.674338,102,83.138438)\curve(102,83.138438,104,86.602540)
\curve(104,86.602540,108,86.602540)\curve(108,86.602540,106,90.066642)\curve(106,90.066642,108,93.530744)
\curve(108,93.530744,104,93.530744)\curve(104,93.530744,102,96.994846)\curve(102,96.994846,100,93.530744)
\curve(100,93.530744,96,93.530744)\curve(96,93.530744,94,96.994846)\curve(94,96.994846,96,100.458946)
\curve(96,100.458946,92,100.458946)\curve(92,100.458946,90,103.923048)\curve(90,103.923048,88,100.458946)
\curve(88,100.458946,84,100.458946)\curve(84,100.458946,86,96.994846)\curve(86,96.994846,84,93.530744)
\curve(84,93.530744,80,93.530744)\curve(80,93.530744,78,96.994846)\curve(78,96.994846,76,93.530744)
\curve(76,93.530744,72,93.530744)\curve(72,93.530744,70,96.994846)\curve(70,96.994846,72,100.458946)
\curve(72,100.458946,68,100.458946)\curve(68,100.458946,66,103.923048)\curve(66,103.923048,68,107.387150)
\curve(68,107.387150,72,107.387150)\curve(72,107.387150,70,110.851252)\curve(70,110.851252,72,114.315354)
\curve(72,114.315354,68,114.315354)\curve(68,114.315354,66,117.779454)\curve(66,117.779454,64,114.315354)
\curve(64,114.315354,60,114.315354)\curve(60,114.315354,58,117.779454)\curve(58,117.779454,60,121.243556)
\curve(60,121.243556,56,121.243556)\curve(56,121.243556,54,124.707658)\curve(54,124.707658,52,121.243556)
\curve(52,121.243556,48,121.243556)\curve(48,121.243556,50,117.779454)\curve(50,117.779454,48,114.315354)
\curve(48,114.315354,44,114.315354)\curve(44,114.315354,42,117.779454)\curve(42,117.779454,40,114.315354)
\curve(40,114.315354,36,114.315354)\curve(36,114.315354,38,110.851252)\curve(38,110.851252,36,107.387150)
\curve(36,107.387150,40,107.387150)\curve(40,107.387150,42,103.923048)\curve(42,103.923048,40,100.458946)
\curve(40,100.458946,36,100.458946)\curve(36,100.458946,38,96.994846)\curve(38,96.994846,36,93.530744)
\curve(36,93.530744,32,93.530744)\curve(32,93.530744,30,96.994846)\curve(30,96.994846,28,93.530744)
\curve(28,93.530744,24,93.530744)\curve(24,93.530744,22,96.994846)\curve(22,96.994846,24,100.458946)
\curve(24,100.458946,20,100.458946)\curve(20,100.458946,18,103.923048)\curve(18,103.923048,16,100.458946)
\curve(16,100.458946,12,100.458946)\curve(12,100.458946,14,96.994846)\curve(14,96.994846,12,93.530744)
\curve(12,93.530744,8,93.530744)\curve(8,93.530744,6,96.994846)\curve(6,96.994846,4,93.530744)
\curve(4,93.530744,0,93.530744)\curve(0,93.530744,2,90.066642)\curve(2,90.066642,0,86.602540)
\curve(0,86.602540,4,86.602540)\curve(4,86.602540,6,83.138438)\curve(6,83.138438,4,79.674338)
\curve(4,79.674338,0,79.674338)\curve(0,79.674338,2,76.210236)\curve(2,76.210236,0,72.746134)
\curve(0,72.746134,4,72.746134)\curve(4,72.746134,6,69.282032)\curve(6,69.282032,8,72.746134)
\curve(8,72.746134,12,72.746134)\curve(12,72.746134,14,69.282032)\curve(14,69.282032,12,65.817930)
\curve(12,65.817930,16,65.817930)\curve(16,65.817930,18,62.353830)\curve(18,62.353830,16,58.889728)
\curve(16,58.889728,12,58.889728)\curve(12,58.889728,14,55.425626)\curve(14,55.425626,12,51.961524)
\curve(12,51.961524,8,51.961524)\curve(8,51.961524,6,55.425626)\curve(6,55.425626,4,51.961524)
\curve(4,51.961524,0,51.961524)\curve(0,51.961524,2,48.497422)\curve(2,48.497422,0,45.033320)
\curve(0,45.033320,4,45.033320)\curve(4,45.033320,6,41.569220)\curve(6,41.569220,4,38.105118)
\curve(4,38.105118,0,38.105118)\curve(0,38.105118,2,34.641016)\curve(2,34.641016,0,31.176914)
}
\end{picture}
%
\
%
\setlength{\unitlength}{0.0077mm}
\begin{picture}(7200,3300)
%%%%%%%%%%%%%%%%%%%
\cierna
\put(0,0){\thicklines      %3
\put(465,0){\line(0,1){465}}\put(465,465){\line(-1,0){465}}\put(0,465){\line(0,-1){465}}
\put(930,0){\line(1,0){465}}\put(1395,0){\line(0,1){465}}\put(1395,465){\line(-1,0){465}}
\put(930,930){\line(1,0){465}}\put(1395,930){\line(0,1){465}}\put(1395,1395){\line(-1,0){465}}
\put(0,1395){\line(0,-1){465}}\put(0,930){\line(1,0){465}}\put(465,930){\line(0,1){465}}
\put(465,0){\line(1,0){465}}\put(930,465){\line(0,1){465}}\put(930,1395){\line(-1,0){465}}
 %
\put(0,2325){\line(1,0){465}}\put(465,2325){\line(0,-1){465}}\put(465,1860){\line(-1, 0){465}}
\put(0,2790){\line(0,1){465}}\put(0,3255){\line(1,0){465}}\put(465,3255){\line(0,-1){465}}
\put(930,2790){\line(0,1){465}}\put(930,3255){\line(1,0){465}}\put(1395,3255){\line(0,-1){465}}
\put(1395,1860){\line(-1,0){465}}\put(930,1860){\line(0,1){465}}\put(930,2325){\line(1,0){465}}
\put(0,2325){\line(0,1){465}}\put(465,2790){\line(1,0){465}}\put(1395,2790){\line(0,-1){465}}
 %
\put(1860,2325){\line(1,0){465}}\put(2325,2325){\line(0,-1){465}}\put(2325,1860){\line(-1,0){465}}
\put(1860,2790){\line(0,1){465}}\put(1860,3255){\line(1,0){465}}\put(2325,3255){\line(0,-1){465}}
\put(2790,2790){\line(0,1){465}}\put(2790,3255){\line(1,0){465}}\put(3255,3255){\line(0,-1){465}}
\put(3255,1860){\line(-1,0){465}}\put(2790,1860){\line(0,1){465}}\put(2790,2325){\line(1,0){465}}
\put(1860,2325){\line(0,1){465}}\put(2325,2790){\line(1,0){465}}\put(3255,2790){\line(0,-1){465}}
 %
\put(2790,0){\line(0,1){465}}\put(2790,465){\line(1,0){465}}\put(3255,465){\line(0,-1){465}}
\put(2325,0){\line(-1,0){465}}\put(1860,0){\line(0,1){465}}\put(1860,465){\line(1,0){465}}
\put(2325,930){\line(-1,0){465}}\put(1860,930){\line(0,1){465}}\put(1860,1395){\line(1,0){465}}
\put(3255,1395){\line(0,-1){465}}\put(3255,930){\line(-1,0){465}}\put(2790,930){\line(0,1){465}}
\put(2790,0){\line(-1,0){465}}\put(2325,465){\line(0,1){465}}\put(2325,1395){\line(1,0){465}}
 %
\cervena
\dottedline{70}(0,1395)(0,1860)\dottedline{70}(1395,1860)(1860,1860)%
```

```
\dottedline{70}(3255,1395)(3255,1860)
}
%%%%%%%%%%%%%%%%%%%
\cervena
\put(3700,0){\thicklines     %4
\put(0,217){\line(1,0){217}}\put(217,217){\line(0,-1){217}}\put(217,0){\line(-1,0){217}}
\put(0,434){\line(0,1){217}}\put(0,651){\line(1,0){217}}\put(217,651){\line(0,-1){217}}
\put(434,434){\line(0,1){217}}\put(434,651){\line(1,0){217}}\put(651,651){\line(0,-1){217}}
\put(651,0){\line(-1,0){217}}\put(434,0){\line(0,1){217}}\put(434,217){\line(1,0){217}}
\put(0,217){\line(0,1){217}}\put(217,434){\line(1,0){217}}\put(651,434){\line(0,-1){217}}
 %
\put(1085,0){\line(0,1){217}}\put(1085,217){\line(-1,0){217}}\put(868,217){\line( 0,-1){217}}
\put(1302,0){\line(1,0){217}}\put(1519,0){\line(0,1){217}}\put(1519,217){\line(-1,0){217}}
\put(1302,434){\line(1,0){217}}\put(1519,434){\line(0,1){217}}\put(1519,651){\line(-1,0){217}}
\put(868,651){\line(0,-1){217}}\put(868,434){\line(1,0){217}}\put(1085,434){\line(0,1){217}}
\put(1085,0){\line(1,0){217}}\put(1302,217){\line(0,1){217}}\put(1302,651){\line(-1,0){217}}
 %
\put(1085,868){\line(0,1){217}}\put(1085,1085){\line(-1,0){217}}\put(868,1085){\line(0,-1){217}}
\put(1302,868){\line(1,0){217}}\put(1519,868){\line(0,1){217}}\put(1519,1085){\line(-1,0){217}}
\put(1302,1302){\line(1,0){217}}\put(1519,1302){\line(0,1){217}}\put(1519,1519){\line(-1,0){217}}
\put(868,1519){\line(0,-1){217}}\put(868,1302){\line(1,0){217}}\put(1085,1302){\line(0,1){217}}
\put(1085,868){\line(1,0){217}}\put(1302,1085){\line(0,1){217}}\put(1302,1519){\line(-1,0){217}}
 %
\put(0,1302){\line(1,0){217}}\put(217,1302){\line(0,1){217}}\put(217,1519){\line(-1,0){217}}
\put(0,1085){\line(0,-1){217}}\put(0,868){\line(1,0){217}}\put(217,868){\line(0,1){217}}
\put(434,1085){\line(0,-1){217}}\put(434,868){\line(1,0){217}}\put(651,868){\line(0,1){217}}
\put(651,1519){\line(-1,0){217}}\put(434,1519){\line(0,-1){217}}\put(434,1302){\line(1,0){217}}
\put(0,1302){\line(0,-1){217}}\put(217,1085){\line(1,0){217}}\put(651,1085){\line(0,1){217}}
 %%
\put(651,0){\line(1,0){217}}\put(868,651){\line(0,1){217}}\put(868,1519){\line(-1,0){217}}
\put(217,1736){\line(0,1){217}}\put(217,1953){\line(-1,0){217}}\put(0,1953){\line(0,-1){217}}
\put(434,1736){\line(1,0){217}}\put(651,1736){\line(0,1){217}}\put(651,1953){\line(-1,0){217}}
\put(434,2170){\line(1,0){217}}\put(651,2170){\line(0,1){217}}\put(651,2387){\line(-1,0){217}}
\put(0,2387){\line(0,-1){217}}\put(0,2170){\line(1,0){217}}\put(217,2170){\line(0,1){217}}
\put(217,1736){\line(1,0){217}}\put(434,1953){\line(0,1){217}}\put(434,2387){\line(-1,0){217}}
 %
\put(0,2821){\line(1,0){217}}\put(217,2821){\line(0,-1){217}}\put(217,2604){\line(-1, 0){217}}
\put(0,3038){\line(0,1){217}}\put(0,3255){\line(1,0){217}}\put(217,3255){\line(0,-1){217}}
\put(434,3038){\line(0,1){217}}\put(434,3255){\line(1,0){217}}\put(651,3255){\line(0,-1){217}}
\put(651,2604){\line(-1,0){217}}\put(434,2604){\line(0,1){217}}\put(434,2821){\line(1,0){217}}
\put(0,2821){\line(0,1){217}}\put(217,3038){\line(1,0){217}}\put(651,3038){\line(0,-1){217}}
 %
\put(868,2821){\line(1,0){217}}\put(1085,2821){\line(0,-1){217}}\put(1085,2604){\line(-1,0){217}}
\put(868,3038){\line(0,1){217}}\put(868,3255){\line(1,0){217}}\put(1085,3255){\line(0,-1){217}}
\put(1302,3038){\line(0,1){217}}\put(1302,3255){\line(1,0){217}}\put(1519,3255){\line(0,-1){217}}
\put(1519,2604){\line(-1,0){217}}\put(1302,2604){\line(0,1){217}}\put(1302,2821){\line(1,0){217}}
\put(868,2821){\line(0,1){217}}\put(1085,3038){\line(1,0){217}}\put(1519,3038){\line(0,-1){217}}
 %
\put(1302,1736){\line(0,1){217}}\put(1302,1953){\line(1,0){217}}\put(1519,1953){\line(0,-1){217}}
\put(1085,1736){\line(-1,0){217}}\put(868,1736){\line(0,1){217}}\put(868,1953){\line(1,0){217}}
\put(1085,2170){\line(-1,0){217}}\put(868,2170){\line(0,1){217}}\put(868,2387){\line(1,0){217}}
\put(1519,2387){\line(0,-1){217}}\put(1519,2170){\line(-1,0){217}}\put(1302,2170){\line(0,1){217}}
\put(1302,1736){\line(-1,0){217}}\put(1085,1953){\line(0,1){217}}\put(1085,2387){\line(1,0){217}}
 %%
\put(0,2387){\line(0,1){217}}\put(651,2604){\line(1,0){217}}\put(1519,2604){\line(0,-1){217}}
\put(1953,1736){\line(0,1){217}}\put(1953,1953){\line(-1,0){217}}\put(1736,1953){\line(0,-1){217}}
\put(2170,1736){\line(1,0){217}}\put(2387,1736){\line(0,1){217}}\put(2387,1953){\line(-1,0){217}}
\put(2170,2170){\line(1,0){217}}\put(2387,2170){\line(0,1){217}}\put(2387,2387){\line(-1,0){217}}
\put(1736,2387){\line(0,-1){217}}\put(1736,2170){\line(1,0){217}}\put(1953,2170){\line(0,1){217}}
\put(1953,1736){\line(1,0){217}}\put(2170,1953){\line(0,1){217}}\put(2170,2387){\line(-1,0){217}}
 %
\put(1736,2821){\line(1,0){217}}\put(1953,2821){\line(0,-1){217}}\put(1953,2604){\line(-1, 0){217}}
\put(1736,3038){\line(0,1){217}}\put(1736,3255){\line(1,0){217}}\put(1953,3255){\line(0,-1){217}}
\put(2170,3038){\line(0,1){217}}\put(2170,3255){\line(1,0){217}}\put(2387,3255){\line(0,-1){217}}
\put(2387,2604){\line(-1,0){217}}\put(2170,2604){\line(0,1){217}}\put(2170,2821){\line(1,0){217}}
\put(1736,2821){\line(0,1){217}}\put(1953,3038){\line(1,0){217}}\put(2387,3038){\line(0,-1){217}}
 %
\put(2604,2821){\line(1,0){217}}\put(2821,2821){\line(0,-1){217}}\put(2821,2604){\line(-1,0){217}}
\put(2604,3038){\line(0,1){217}}\put(2604,3255){\line(1,0){217}}\put(2821,3255){\line(0,-1){217}}
\put(3038,3038){\line(0,1){217}}\put(3038,3255){\line(1,0){217}}\put(3255,3255){\line(0,-1){217}}
\put(3255,2604){\line(-1,0){217}}\put(3038,2604){\line(0,1){217}}\put(3038,2821){\line(1,0){217}}
\put(2604,2821){\line(0,1){217}}\put(2821,3038){\line(1,0){217}}\put(3255,3038){\line(0,-1){217}}
 %
\put(3038,1736){\line(0,1){217}}\put(3038,1953){\line(1,0){217}}\put(3255,1953){\line(0,-1){217}}
\put(2821,1736){\line(-1,0){217}}\put(2604,1736){\line(0,1){217}}\put(2604,1953){\line(1,0){217}}
\put(2821,2170){\line(-1,0){217}}\put(2604,2170){\line(0,1){217}}\put(2604,2387){\line(1,0){217}}
\put(3255,2387){\line(0,-1){217}}\put(3255,2170){\line(-1,0){217}}\put(3038,2170){\line(0,1){217}}
\put(3038,1736){\line(-1,0){217}}\put(2821,1953){\line(0,1){217}}\put(2821,2387){\line(1,0){217}}
 %%
\put(1736,2387){\line(0,1){217}}\put(2387,2604){\line(1,0){217}}\put(3255,2604){\line(0,-1){217}}
\put(3255,217){\line(-1,0){217}}\put(3038,217){\line(0,-1){217}}\put(3038,0){\line(1,0){217}}
\put(3255,434){\line(0,1){217}}\put(3255,651){\line(-1,0){217}}\put(3038,651){\line(0,-1){217}}
```

```
\put(2821,434){\line(0,1){217}}\put(2821,651){\line(-1,0){217}}\put(2604,651){\line(0,-1){217}}
\put(2604,0){\line(1,0){217}}\put(2821,0){\line(0,1){217}}\put(2821,217){\line(-1,0){217}}
\put(3255,217){\line(0,1){217}}\put(3038,434){\line(-1,0){217}}\put(2604,434){\line(0,-1){217}}
 %
\put(2170,0){\line(0,1){217}}\put(2170,217){\line(1,0){217}}\put(2387,217){\line( 0,-1){217}}
\put(1953,0){\line(-1,0){217}}\put(1736,0){\line(0,1){217}}\put(1736,217){\line(1,0){217}}
\put(1953,434){\line(-1,0){217}}\put(1736,434){\line(0,1){217}}\put(1736,651){\line(1,0){217}}
\put(2387,651){\line(0,-1){217}}\put(2387,434){\line(-1,0){217}}\put(2170,434){\line(0,1){217}}
\put(2170,0){\line(-1,0){217}}\put(1953,217){\line(0,1){217}}\put(1953,651){\line(1,0){217}}
 %
\put(2170,868){\line(0,1){217}}\put(2170,1085){\line(1,0){217}}\put(2387,1085){\line(0,-1){217}}
\put(1953,868){\line(-1,0){217}}\put(1736,868){\line(0,1){217}}\put(1736,1085){\line(1,0){217}}
\put(1953,1302){\line(-1,0){217}}\put(1736,1302){\line(0,1){217}}\put(1736,1519){\line(1,0){217}}
\put(2387,1519){\line(0,-1){217}}\put(2387,1302){\line(-1,0){217}}\put(2170,1302){\line(0,1){217}}
\put(2170,868){\line(-1,0){217}}\put(1953,1085){\line(0,1){217}}\put(1953,1519){\line(1,0){217}}
 %
\put(3255,1302){\line(-1,0){217}}\put(3038,1302){\line(0,1){217}}\put(3038,1519){\line(1,0){217}}
\put(3255,1085){\line(0,-1){217}}\put(3255,868){\line(-1,0){217}}\put(3038,868){\line(0,1){217}}
\put(2821,1085){\line(0,-1){217}}\put(2821,868){\line(-1,0){217}}\put(2604,868){\line(0,1){217}}
\put(2604,1519){\line(1,0){217}}\put(2821,1519){\line(0,-1){217}}\put(2821,1302){\line(-1,0){217}}
\put(3255,1302){\line(0,-1){217}}\put(3038,1085){\line(-1,0){217}}\put(2604,1085){\line(0,1){217}}
\put(2604,0){\line(-1,0){217}}\put(2387,651){\line(0,1){217}}\put(2387,1519){\line(1,0){217}}
 %%
\modra
\dottedline{70}(0,1519)(0,1736)\dottedline{70}(1519,1736)(1736,1736)%
\dottedline{70}(3255,1519)(3255,1736)
}
\end{picture}
\caption{Konštrukcia Peanovej krivky, van Kochovej snehovej vločky a Hilbertovej krivky}
\label{picture13}
\end{center}
\end{figure}
```

Hypocykloida, epicykloida a Lissajousova krivka

```
%.....................................................................
\begin{figure}[ht]
\begin{center}
\setlength{\unitlength}{0.043mm}%
\begin{picture}(800,800)
%%%%%%%%%%%%%%%%%%%
\put(0,0){\thinlines         %1 predĺžená epicykloida
\put(400,0){\line(0,1){800}}\put(0,400){\line(1,0){800}}
\put(385,790){\makebox(0,0)[r]{{\scriptsize$y$}}}
\put(10,415){\makebox(0,0)[b]{{\scriptsize$x$}}}
\put(415,385){\makebox(0,0)[lt]{{\scriptsize$0$}}}
\put(400,400){\bigcircle{380}}\put(400,400){\circle*{10}}
\put(410,190){\makebox(0,0)[lt]{{\scriptsize$R$}}}
\put(307.654528,146.283004){\bigcircle{100}}
\cervena
\thicklines
\curve(645.1667,387.0107,634.9275,396.3878,623.2245,404.7182%
,606.1806,412.9509,601.589900,414.4208,582.575400,416.8992,581.0639,416.8116%
,568.1505,413.5571,559.7799,406.2965,558,400)
\curve(558,400,559.7799,393.7035,568.1505,386.4429,581.0639,383.1884%
,582.575400,383.1008,601.589900,385.5792,606.1806,387.0491,623.2245,395.2818%
,634.9275,403.6122,645.1667,412.9893,664.9499,438.7862,680.1567,472.0433%
,681.85980,477.4537,688.6186,511.458,688.597,555.1489,682.1179,589.9829%
,678.92960,600.7979,659.132500,645.8275,657.2923,649.0191,629.447700,687.6005%
,615.6767,702.1668,590.8333,723.62390,544.896500,751.74340,493.7755,770.31090%
,439.9787,778.3122,386.1951,775.4453,354.1336,768.3985,335.0895,762.1421%
,292.2382,741.4633,289.1008,739.5323,250.258,709.3523,242.3066,701.3582%
,220.0293,673.80640,199.2157,635.3917,188.9756,602.2689,187.8984,596.7001%
,185.4437,560.2136,190.5645,528.1102,195.1066,514.99,201.4343,502.0936%
,212.5056,486.7411,215.8435,483.2635,231.3866,472.0339,232.7576,471.3915%
,245.6636,468.1077,256.481,470.5092,261.0431,475.1997)
\curve(261.0431,475.1997,262.4746,481.5844,258.5685,491.9539,248.7605,500.9623%
,247.4729,501.7587,229.5705,508.6288,224.8335,509.5211,205.9255,510.3927%
,191.6682,508.6363,178.2001,505.2628,148.5233,491.9908,119.3207,469.9796%
,115.2479,466.0319,93.1193,439.3429,72.3438,400.9076,61.4629,367.1883%
,59.1196,356.1593,55.0988,307.1345,55.1982,303.4519,61.3241,256.2679%
,66.5025,236.9029,78.1392,206.2079,105.156,159.614,141.2784,118.9535%
,184.783,86.3121,233.4488,63.2353,265,54.1731,284.7265,50.6115%
,332.2551,48.403,335.9334,48.6081,384.4588,56.6635,395.2565,59.9096%
,427.9621,73.5379,464.5505,97.4164,489.321,121.6733,492.9189,126.0582%
,512.4434,156.9788,523.2193,187.6502,525.4692,201.3509,526.0422,215.7045%
,523.6122,234.476,522.3318,239.1231,514.0068,256.397,513.1067,257.6144%
,503.3192,266.6451,492.6625,269.6815,486.4178,267.7277)
\curve(486.4178,267.7277,482.1201,262.7938,480.6201,251.815,484.9584,239.2242%
,485.7118,237.911,498.1866,223.3483,501.928,220.309,518.1423,210.5433%
,531.5172,205.3022,544.967600,201.8591,577.384300,199.4069,613.5435,204.8662%
```

```
,619.004300,206.3996,651.1684,219.3399,687.7331,243.2547,713.35120,267.7312%
,720.6613,276.3156,747.53060,317.5179,749.196,320.804,766.2655,365.2166%
,770.9279,384.7123,775.303,417.2463,773.7187,471.083,761.3022,524.0352%
,738.5766,573.4483,706.75970,616.9061,683.3243,639.8927,667.6706,652.4139%
,626.9215,676.9773,623.5889,678.5477,577.0782,694.5586,566.036900,696.843%
,530.786900,700.4234,487.2434,696.837,453.9134,687.2931,448.6621,685.1491%
,416.7743,667.2479,392.6992,645.402,384.1997,634.4234,376.8642,622.0725%
,370.067,604.406900,368.9813,599.7105,368.0815,580.5563,368.2936,579.0572%
,372.6034,566.4567,380.5305,558.7142,386.9525,557.4603)
\curve(386.9525,557.4603,393.0805,559.7541,399.6251,568.6957,401.8021,581.8338%
,401.7646,583.3474,397.7243,602.092200,395.8804,606.5459,386.2684,622.851700%
,377,633.8269,366.8094,643.2567)
\put(590,190){\makebox(0,0)[t]{{\scriptsize$f_h$}}}
\zelena
\thinlines
\put(670,400){\bigcircle{160}}\put(670,400){\circle*{10}}
\put(640,315){\makebox(0,0)[t]{{\scriptsize$k$}}}
\put(606.831948,573.552717){\bigcircle{160}}\put(606.831948,573.552717){\circle*{10}}
\dottedline{5}(400,400)(668.115488,624.975744)
\put(307.654528,146.283004){\bigcircle{160}}\put(307.654528,146.283004){\circle*{10}}
\dottedline{5}(400,400)(280.292907,71.107598)
\modra
\thinlines
\put(640,560){\makebox(0,0)[l]{{\scriptsize$c$}}}
\put(800,800){\makebox(0,0)[rt]{{\small$c>r$}}}
\put(558,400){\circle*{15}}
\curve(670,400,558,400)
\put(550,380){\makebox(0,0)[rt]{{\scriptsize$B$}}}
\put(686.027973,494.356706){\circle*{15}}
\curve(606.831948,573.552717,686.027973,494.356706)
\put(369.878367,53.158389){\circle*{15}}
\curve(307.654528,146.283004,369.878367,53.158389)
\fialova
\thinlines
\put(580,565){\makebox(0,0)[r]{{\scriptsize$r$}}}
\put(470,425){\makebox(0,0)[c]{{\scriptsize$\varphi$}}}
\curve(484.2649,470.7067,500.0081,460.5227)\curve(484.2649,470.7067,488.1958,452.3734)
\put(307.654528,146.283004){\arc(0,50){-20}}
\put(307.654528,146.283004){\arc(0,50){213.75}}
\curve(335.4330,104.7095,322.8665,90.7938)\curve(335.4330,104.7095,316.7073,103.7555)
\put(400,400){\arc(125,0){250}}
\curve(357.2475,282.5384,338.4998,282.8310)\curve(357.2475,282.5384,344.1978,296.0020)
\put(606.831948,573.552717){\arc(0,-50){-50}}
\put(606.831948,573.552717){\arc(0,-50){45}}
\curve(642.1873,538.1974,632.4269,522.1881)\curve(642.1873,538.1974,623.9654,533.7788)
\put(400,400){\arc(110,0){40}}
}
\end{picture}
%
\
%
\setlength{\unitlength}{0.043mm}%
\begin{picture}(800,800)
%%%%%%%%%%%%%%%%%%%
\put(0,0){\thinlines         %3 skrátená hypocykloida
\put(400,0){\line(0,1){800}}\put(0,400){\line(1,0){800}}
\put(385,790){\makebox(0,0)[r]{{\scriptsize$y$}}}
\put(10,415){\makebox(0,0)[b]{{\scriptsize$x$}}}
\put(415,385){\makebox(0,0)[lt]{{\scriptsize$0$}}}
\put(400,400){\bigcircle{700}}\put(400,400){\circle*{10}}
\put(208.488889,239.303098){\bigcircle{120}}
\put(410,70){\makebox(0,0)[lb]{{\scriptsize$R$}}}
\cervena
\thicklines
\curve(688.2362,374.497,693.8721,377.3242,707.2363,384.2722%
,713.0724,387.6087,717.0232,390.14,724.4122,397.4614,725,400)
\curve(725,400,724.412200,402.538600,717.023200,409.860000,713.072400,412.391300%
,707.236300,415.727800,693.872100,422.675800,688.236200,425.503000,657.783500,440.898300%
,652.086300,443.873400,612.164500,466.039700,607.722600,468.665900,587.060500,481.344000%
,561.156300,498.375200,558.800800,499.989800,509.110700,536.820500,462.146300,577.069200%
,460.048100,579.006400,437.679700,600.471300,420.721700,617.794100,417.172900,621.540300%
,386.678900,655.528700,382.510600,660.421000,360.725000,686.684500,356.714600,691.550000%
,346.967000,703.033000,342.415500,707.980400,339.068500,711.268900,330.286500,716.843400%
,327.680700,716.851600)
\curve(327.680700,716.851600,325.336500,715.713600,319.842900,706.880700,318.254200,702.465700%
,316.300000,696.033500,312.500000,681.458300,310.997800,675.334600,302.764900,642.219600%
,301.132200,636.003200,288.405000,592.149800,286.833100,587.234900,279.070500,564.269800%
,268.230600,535.225300,267.180700,532.569500,242.330400,475.929700,213.541500,421.186600%
,212.119800,418.709900,196.170400,392.125900,183.055400,371.738400,180.192900,367.445000%
,153.842200,330.152400,150,325,129.242800,297.916400,125.391700,292.923900%
,116.365600,280.865500,112.555100,275.327200,110.093800,271.332300,106.613200,261.530000%
,107.185100,258.987800)
```

```
\curve(107.185100,258.987800,108.816200,256.955600,118.650000,253.565200,123.307900,252.998800%
,130.013700,252.524900,145.069100,252.063500,151.373500,251.961600,185.490200,251.303900%
,191.914100,251.095300,237.500000,248.445600,242.641500,248.006700,266.758100,245.549000%
,297.486600,241.443900,300.309400,241.011200,361.058800,229.387600,420.835500,213.501900%
,423.566500,212.667000,453.033000,203.033000,475.827700,194.783500,480.650400,192.948100%
,522.871600,175.556400,528.749800,172.957100,559.773300,158.747000,565.497600,156.103400%
,579.262200,149.986900,585.509500,147.504300,589.951900,145.993600,600.282900,144.781500%
,602.634200,145.904800)
\curve(602.634200,145.904800,604.252500,147.947100,605.369600,158.288900,604.885400,162.956000%
,603.855200,169.599100,600.954900,184.379700,599.651400,190.548700,592.700900,223.956400%
,591.474800,230.265600,583.914300,275.298300,583.198000,280.408400,580.227700,304.467400%
,577.392200,335.338900,577.185900,338.187200,575,400,577.185900,461.812800%
,577.392200,464.661100,580.227700,495.532600,583.198000,519.591600,583.914300,524.701700%
,591.474800,569.734400,592.700900,576.043600,599.651400,609.451300,600.954900,615.620300%
,603.855200,630.400900,604.885400,637.044000,605.369600,641.711100,604.252500,652.052900%
,602.634200,654.095200)
\curve(602.6342,654.0952,600.2829,655.2185,589.9519,654.0064,585.5095,652.4957%
,579.2622,650.0131,565.4976,643.8966)
\put(220,500){\makebox(0,0)[rt]{{\scriptsize$f_e$}}}
\zelena
\thinlines
\put(650,400){\bigcircle{200}}\put(650,400){\circle*{10}}
\put(650,385){\makebox(0,0)[rt]{{\scriptsize$S$}}}
\put(650,285){\makebox(0,0)[t]{{\scriptsize$k$}}}
\put(208.488889,239.303098){\bigcircle{200}}\put(208.488889,239.303098){\circle*{10}}
\dottedline{5}(400,400)(131.884445,175.024337)
\put(525,616.506407){\bigcircle{200}}\put(525,616.506407){\circle*{10}}
\dottedline{5}(400,400)(575,703.10897)
\modra
\put(480,605){\makebox(0,0)[b]{{\scriptsize$c$}}}
\put(800,800){\makebox(0,0)[rt]{{\small$c<r$}}}
\thinlines
\put(134.628308,252.326712){\circle*{15}}
\dottedline{5}(208.488889,239.303098)(134.628308,252.326712)
\put(725,400){\circle*{15}}
\curve(650,400,725,400)
\put(760,387){\makebox(0,0)[lt]{{\scriptsize$B$}}}
\dottedline{5}(525,616.506407)(460.048095,579.006407)
\put(460.048095,579.006407){\circle*{15}}
\fialova
\thinlines
\put(400,400){\arc(110,0){220}}
\curve(315.7351,329.2934,299.7324,339.0646)\curve(315.7351,329.2934,311.3288,347.5183)
%\curve(327.2258,338.9352,311.2231,348.7064)\curve(327.2258,338.9352,322.8195,357.1601)
\put(400,400){\arc(95,0){60}}
\curve(447.5,482.2725,465.4404,476.8223)\curve(447.5,482.2725,456.3319,465.7328)
%\curve(440.0000,469.2821,457.9404,463.8319)\curve(440.0000,469.2821,448.8319,452.7424)
\put(450,410){\makebox(0,0)[b]{{\scriptsize$\varphi$}}}
\put(540,670){\makebox(0,0)[r]{{\scriptsize$r$}}}
\put(525,616.506407){\arc(55,0){60}}
\put(525,616.506407){\arc(55,0){-150}}
\curve(477.3686,589.0064,493.4502,579.3656)\curve(477.3686,589.0064,481.9229,570.8179)
\put(208.488889,239.303098){\arc(-60,0){40}}   %75
\curve(149.4004,249.7220,156.2226,232.2572)\curve(149.4004,249.7220,141.8749,232.5485)
}
\end{picture}
%
\
%
\setlength{\unitlength}{0.086mm}%
%
\begin{picture}(620,400)
%%%%%%%%%%%%%%%%%%%%
\put(0,0){\thinlines            %3
\put(150,0){\line(0,1){400}}\put(0,200){\line(1,0){300}}
\put(140,390){\makebox(0,0)[r]{{\scriptsize$y$}}}
\put(10,190){\makebox(0,0)[t]{{\scriptsize$x$}}}
\put(140,190){\makebox(0,0)[rt]{{\scriptsize$0$}}}
\fialova
\linethickness{.075mm}
\put(200,390){\vector(1,0){50}}\put(200,390){\vector(-1,0){50}}
\put(200,380){\makebox(0,0)[t]{{\scriptsize$a$}}}
\dottedline{5}(250,200)(250,390)
\put(290,275){\vector(0,1){75}}\put(290,275){\vector(0,-1){75}}
\put(280,275){\makebox(0,0)[r]{{\scriptsize$b$}}}
\dottedline{5}(79.2893,350)(290,350)
\put(185.35535,30){\vector(1,0){35.35535}}\put(185.35535,30){\vector(-1,0){35.35535}}
\put(170,20){\makebox(0,0)[lt]{{\scriptsize$a\sin{c}$}}}
\dottedline{5}(220.7107,30)(220.7107,200)
\cervena
\thicklines
\curve(220.7107,200,230.4835,207.4969,238.4489,214.975,244.4279,222.4157%
```

```
,248.2863,229.8004,249.9374,237.1106,249.344,244.328,246.5197,251.4347%
,241.5277,258.4128,234.4802,265.2448,225.5354,271.9138,220.7107,275%
,214.8943,278.4031,202.7958,284.6964,189.5116,290.778,175.3401,296.6327%
,160.5995,302.2458,150,306.066,145.6208,307.6034,130.7405,312.6921%
,102.602,322.0123,89.9757,326.2206,79.2893,329.9038)
\curve(79.2893,329.9038,78.6973,330.1135,69.0203,333.6811,61.162,336.9146%
,55.2987,339.8059,51.5622,342.3477,50.0364,344.5337,50.7556,346.3585%
,53.7036,347.8175,58.8142,348.9069,65.9727,349.6242,75.0182,349.9676%
,79.2893,350,85.7476,349.936,97.9201,349.5298,111.2621,348.7497%
,125.4741,347.5979,140.2369,346.0771,155.2189,344.1913,170.0838,341.945%
,184.4976,339.344,198.1366,336.3946,210.6947,333.1044,220.7107,329.9038)
\curve(220.7107,329.9038,221.8896,329.4814,231.4701,325.5348,239.2209,321.2745%
,244.968,316.711,248.5823,311.8558,249.9827,306.721,250,306.066%
,249.1377,301.3195,246.0663,295.6647,240.8374,289.7708,233.5686,283.6526%
,224.4229,277.3252,220.7107,275,213.6059,270.8046,201.3604,264.107%
,187.9615,257.2491,173.71,250.2482,158.9261,243.1217,143.9417,235.8874%
,129.0934,228.5634,114.7145,221.168,101.1282,213.7197,88.6393,206.2371,79.2893,200)
\curve(79.2893,200,77.5285,198.7389,68.0453,191.2439,60.4026,183.7707%
,54.772,176.3381,51.2801,168.9647,50.0052,161.6688,50.9759,154.4688%
,54.1706,147.3825,59.5173,140.4278,66.8961,133.6219,76.1413,126.982%
,79.2893,125,87.0451,120.5246,99.3628,114.2658,112.8177,108.2213%
,127.1076,102.4062,141.9116,96.8351,150,93.934,156.8973,91.5218%
,171.7281,86.4796,186.0709,81.7212,212.0223,73.1024,220.7107,70.0962)
\curve(220.7107,70.0962,223.0482,69.2636,232.4336,65.7516,239.9676,62.5751%
,245.4812,59.7421,248.8505,57.2597,249.9998,55.134,248.9034,53.3705%
,245.5858,51.9734,240.1215,50.9463,232.6333,50.2918,223.2893,50.0115%
,220.7107,50,212.2995,50.1061,199.9105,50.5753,186.4006,51.418%
,172.0732,52.6321,157.2501,54.2145,142.2642,56.1614,127.4521,58.4677%
,113.1463,61.1278,99.6682,64.135,87.3204,67.4818,79.2893,70.0962)
\curve(79.2893,70.0962,76.3802,71.1598,67.0934,75.1599,59.6685,79.472%
,54.2723,84.0853,51.0259,88.9884,50,93.934,50.0022,94.169%
,51.2243,99.614,54.6646,105.31,60.246,111.2427,67.8431,117.3972%
,77.2852,123.7581,79.2893,125,88.3604,130.3097,100.8198,137.0354%
,114.3838,143.9185,128.7475,150.9418,143.5886,158.0877,158.5737,165.3383%
,173.3662,172.6756,187.634,180.0812,201.0565,187.5366,213.3325,195.0231,220.7107,200)
\put(180,110){\makebox(0,0)[l]{{\scriptsize$f_3$}}}
}
%%%%%%%%%%%%%%%%%%%
\put(320,0){\thinlines           %4
\put(150,0){\line(0,1){400}}\put(0,200){\line(1,0){300}}
\put(140,390){\makebox(0,0)[r]{{\scriptsize$y$}}}
\put(10,190){\makebox(0,0)[t]{{\scriptsize$x$}}}
\put(140,190){\makebox(0,0)[rt]{{\scriptsize$0$}}}
\fialova
\linethickness{.075mm}
\put(200,390){\vector(1,0){50}}\put(200,390){\vector(-1,0){50}}
\put(200,380){\makebox(0,0)[t]{{\scriptsize$a$}}}
\dottedline{5}(250,200)(250,390)
\put(290,275){\vector(0,1){75}}\put(290,275){\vector(0,-1){75}}
\put(280,275){\makebox(0,0)[r]{{\scriptsize$b$}}}
\dottedline{5}(150,350)(290,350)
\put(185.35535,30){\vector(1,0){35.35535}}\put(185.35535,30){\vector(-1,0){35.35535}}
\put(170,20){\makebox(0,0)[lt]{{\scriptsize$a\sin{c}$}}}
\dottedline{5}(220.7107,30)(220.7107,200)
\cervena
\thicklines
\curve(220.7107,200,233.3492,207.4969,242.6649,214.975,248.2863,222.4157%
,249.9893,229.8004,247.7061,237.1106,241.5277,244.328,231.7003,251.4347%
,218.6158,258.4128,202.7958,265.2448,184.871,271.9138,175.8819,275%
,165.556,278.4031,145.6208,284.6964,125.8603,290.778,107.0621,296.6327%
,89.9757,302.2458,79.2893,306.066,75.2822,307.6034,63.5676,312.6921%
,55.2987,317.499,50.8053,322.0123,50.2664,326.2206,53.4074,329.9038%
,53.7036,330.1135,60.9799,333.6811,71.8051,336.9146,85.7476,339.8059%
,102.2518,342.3477,120.6595,344.5337,140.2369,346.3585,160.2035,347.8175%
,179.7634,348.9069,198.1366,349.6242,214.5909,349.9676,220.7107,350)
\curve(220.7107,350,228.4701,349.936,239.2209,349.5298,246.4148,348.7497%
,249.7649,347.5979,249.1377,346.0771,244.5582,344.1913,236.209,341.945%
,224.4229,339.344,209.6698,336.3946,175.8819,329.9038%
,173.71,329.4814,153.937,325.5348,134.007,321.2745,114.7145,316.711%
,96.8288,311.8558,81.0629,306.721,79.2893,306.066,68.0453,301.3195%
,58.2949,295.6647,52.2006,289.7708,50.0052,283.6526,51.7963,277.3252%
,53.4074,275,57.5024,270.8046,66.8961,264.107,79.603,257.2491%
,95.1163,250.2482,112.8177,243.1217,132.0014,235.8874,151.9026,228.5634%
,171.7281,221.168,190.6872,213.7197,208.0243,206.2371,220.7107,200)
\curve(220.7107,200,223.0482,198.7389,235.1599,191.2439,243.8765,183.7707%
,248.8505,176.3381,249.8837,168.9647,246.9349,161.6688,240.1215,154.4688%
,229.7153,147.3825,216.1311,140.4278,199.9105,133.6219,181.7,126.982%
,175.8819,125,162.2258,120.5246,142.2642,114.2658%
,104.0498,102.4062,87.3204,96.8351,79.2893,93.934,73.0898,91.5218%
,61.9254,86.4796,54.2723,81.7212,50.4355,77.2584,50.5681,73.1024%
,53.4074,70.0962,54.6646,69.2636,62.5619,65.7516,73.9451,62.5751%
,88.3604,59.7421,105.233,57.2597,123.8904,55.134,143.5886,53.3705%
```

```
,163.5425,51.9734,182.9564,50.9463,201.0565,50.2918,217.1212,50.0115,220.7107,50)
\curve(220.7107,50,230.5099,50.1061,240.6889,50.5753,247.2525,51.418%
,249.9389,52.6321,248.6411,54.2145,243.4107,56.1614,234.4564,58.4677%
,222.1351,61.1278,206.9379,64.135,175.8819,70.0962%
,170.4302,71.1598,150.575,75.1599,130.697,79.472,111.5885,84.0853%
,94.0113,88.9884,79.2893,93.934,78.6662,94.169,66.165,99.614%
,57.006,105.31,51.5544,111.2427,50.0275,117.3972,52.4862,123.7581%
,53.4074,125,58.8325,130.3097,68.8133,137.0354,82.0308,143.9185%
,97.958,150.9418,115.9599,158.0877,155.2633,172.6756%
,174.9977,180.0812,193.7356,187.5366,210.7299,195.0231,220.7107,200)
\put(180,90){\makebox(0,0)[l]{{\scriptsize$f_4$}}}
}
\end{picture}
\caption{Hypocykloida, epicykloida a Lissajousova krivka}
\label{picture14}
\end{center}
\end{figure}
```

Rovinná krivka s menom ruža

```
%...........................................................................
\begin{figure}[ht]
\begin{center}
\setlength{\unitlength}{0.07mm}%
\begin{picture}(1730,630)
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
\put(0,330){\thinlines             %12
\put(150,0){\line(0,1){300}}\put(0,150){\line(1,0){300}}
\put(160,300){\makebox(0,0)[lt]{{\scriptsize$y$}}}
\put(300,160){\makebox(0,0)[br]{{\scriptsize$x$}}}
\put(140,30){\makebox(0,0)[r]{{\scriptsize$-a$}}}
\put(140,140){\makebox(0,0)[rt]{{\scriptsize$0$}}}
\put(140,270){\makebox(0,0)[r]{{\scriptsize$a$}}}
\put(30,140){\makebox(0,0)[t]{{\scriptsize$-a$}}}
\put(270,140){\makebox(0,0)[t]{{\scriptsize$a$}}}
\multiput(30,145)(240,0){2}{\line(0,1){10}}
\multiput(145,30)(0,240){2}{\line(1,0){10}}
\cervena
\thicklines
\curve(150,150,150.2045,142.9981,151.4977,131.1299,153.951,119.5907%
,157.5031,108.5801,162.065,98.2863,167.5221,88.8818,173.7369,80.5199%
,180.5517,73.3312,187.7929,67.421,195.2742,62.867,201.9615,60%
,202.8014,59.7177,210.1765,57.9914,217.2023,57.676,223.687,58.7292%
,229.4487,61.0799,234.3191,64.6297,234.8528,65.1472,238.1479,69.2553%
,240.8059,74.8112,242.1883,81.1333,242.2171,88.0426,240.8427,95.3493%
,240,98.0385,238.0455,102.8573,233.8362,110.3683,228.2559,117.6867%
,221.3752,124.624,213.2928,131.0028,204.1331,136.6613,194.0443,141.4566%
,183.1943,145.2683,171.7679,148.0006,159.9621,149.5854,150,150)
\curve(150,150,147.9824,149.983,136.0379,149.1836,124.3371,147.207,113.0831,144.1027%
,102.4692,139.9483,92.6751,134.848,83.8622,128.9303,76.1713,122.3448%
,69.7182,115.259,64.5926,107.8543,60.8551,100.3223,60,98.0385%
,58.5367,92.8598,57.6378,85.6651,58.1288,78.9325,59.9503,72.8487%
,63.015,67.5883,65.1472,65.1472,67.2096,63.3093,72.3975,60.1501%
,78.4219,58.2261,85.1095,57.6266,92.2745,58.4133,98.0385,60%
,99.7228,60.6183,107.2566,64.2435,114.6785,69.2604,121.7966,75.6107%
,128.4283,83.207,134.4049,91.9353,139.5753,101.657,143.8091,112.212%
,147.0003,123.422,149.0689,135.0945,149.9632,147.0272,150,150)
\curve(150,150,149.6609,159.0118,148.1696,170.839,145.5265,182.303,141.7977,193.2058%
,137.0765,203.3617,131.4818,212.601,125.1546,220.7741,118.2556,227.7545%
,110.9607,233.4413,103.4579,237.7617,98.0385,240,95.9425,240.6721%
,88.6124,242.1595,81.6644,242.2411,75.2888,240.9639,69.6657,238.404%
,65.1472,234.8528,64.9605,234.664,61.3201,229.8713,58.87,224.1747%
,57.7105,217.741,57.915,210.7513,59.5281,203.3969,60,201.9615%
,62.5643,195.8746,67.0078,188.3824,72.8125,181.1151,79.9029,174.2598%
,88.1758,167.9912,97.5027,162.4684,107.7317,157.8307,118.6919,154.1946%
,130.1962,151.6512,142.0458,150.2641,150,150)
\curve(150,150,154.0342,150.0678%
,165.9522,151.0674,177.5918,153.2379,188.7514,156.5249,199.2396,160.8464%
,208.8795,166.0937,217.5129,172.1346,225.0032,178.8164,231.2385,185.9689%
,236.1342,193.4086,239.6344,200.9428,240,201.9615,241.7133,208.374%
,242.3755,215.5045,241.6559,222.1408,239.6185,228.0979,236.3553,233.2039%
,234.8528,234.8528,231.9835,237.3037,226.6435,240.2625,220.4951,241.9694%
,213.7139,242.3393,206.4875,241.3156,201.9615,240,199.011,238.8711%
,191.4823,235.009,184.0982,229.763,177.0495,223.1964,170.5166,215.4011%
,164.6655,206.4954,159.6441,196.6218,155.5789,185.9438,152.5716,174.6423%
,150.6977,162.9116,150.0038,150.9556,150,150)
\put(240,60){\makebox(0,0)[l]{{\scriptsize$f_2$}}}
}
%%%%%%%%%%%%%%%%%%%%%
\put(350,330){\thinlines             %13
\put(150,0){\line(0,1){300}}\put(0,150){\line(1,0){300}}
```

```
\put(160,300){\makebox(0,0)[lt]{{\scriptsize$y$}}}
\put(300,160){\makebox(0,0)[br]{{\scriptsize$x$}}}
\put(140,25){\makebox(0,0)[rt]{{\scriptsize$-a$}}}
\put(140,270){\makebox(0,0)[r]{{\scriptsize$a$}}}
\put(30,140){\makebox(0,0)[t]{{\scriptsize$-a$}}}
\put(270,140){\makebox(0,0)[t]{{\scriptsize$a$}}}
\multiput(30,145)(240,0){2}{\line(0,1){10}}
\multiput(145,30)(0,240){2}{\line(1,0){10}}
\cervena
\thicklines
\curve(150,150,167.9102,150.8963,185.2853,153.5403,201.6098,157.8001%
,216.4065,163.4613,229.2538,170.2368,239.8009,177.7787,247.78,185.6925%
,253.0158,193.5544,255.4305,200.9287,255.0461,207.3869,253.923,210%
,251.9822,212.5258,246.4501,215.9851,238.7436,217.4633,229.2263,216.7314%
,218.3169,213.6438,210,210,206.472,208.1457,194.1674,200.2772%
,181.8796,190.1734,170.0665,178.0607,159.1497,164.2498,150,150)
\curve(150,150,149.498,149.1249,141.4137,133.1299,135.1209,116.7526,130.7579,100.5064%
,128.3729,84.9117,127.9228,70.4757,129.2769,57.6741,132.2233,46.9327%
,136.4788,38.6113,141.7023,32.9902,147.5095,30.2594,150,30%
,153.4905,30.5112,159.2277,33.7373,164.3143,39.8283,168.3722,48.5785%
,171.0688,59.6934,172.1323,72.8012,171.3637,87.4663,168.6466,103.2067%
,163.9533,119.5114,157.3472,135.8599,150,150)
\curve(150,150,148.9814,151.7417%
,139.0939,166.6753,127.9989,180.2256,116.0753,192.0201,103.7519,201.7615%
,91.4911,209.2383,90,210,79.7705,214.3312,69.0641,217.0163%
,59.8233,217.364,52.4586,215.5346,47.3231,211.7701,46.077,210%
,44.6974,206.3828,44.778,199.7414,47.6682,192.2546,53.3733,184.3537%
,61.7992,176.4733,72.7542,169.0338,85.9559,162.4228,101.0407,156.979%
,117.5765,152.9781,135.0784,150.621,150,150)
\put(180,60){\makebox(0,0)[l]{{\scriptsize$f_3$}}}
}
%%%%%%%%%%%%%%%%%%%
\put(700,330){\thinlines              %15
\put(150,0){\line(0,1){300}}\put(0,150){\line(1,0){300}}
\put(160,300){\makebox(0,0)[lt]{{\scriptsize$y$}}}
\put(300,160){\makebox(0,0)[br]{{\scriptsize$x$}}}
\put(140,30){\makebox(0,0)[r]{{\scriptsize$-a$}}}
\put(140,275){\makebox(0,0)[rb]{{\scriptsize$a$}}}
\put(30,140){\makebox(0,0)[t]{{\scriptsize$-a$}}}
\put(270,140){\makebox(0,0)[t]{{\scriptsize$a$}}}
\multiput(30,145)(240,0){2}{\line(0,1){10}}
\multiput(145,30)(0,240){2}{\line(1,0){10}}
\cervena
\thicklines
\curve(150,150,161.9776,150.2396,173.8213,150.9534,185.3986,152.1265%
,196.5807,153.7344,207.2436,155.7435,217.2698,158.1114,226.5498,160.7875%
,234.9832,163.7145,242.4805,166.8286,248.9637,170.0609,254.3672,173.3385%
,258.639,176.5858,261.7408,179.7254,263.6486,182.6802,264.3532,185.3736%
,263.8597,187.7319,262.1876,189.6849,259.3705,191.1674,255.4555,192.1202%
,250.5022,192.4917,244.5824,192.2379,237.7786,191.3245,230.1829,189.7265%
,221.8959,187.4298,213.025,184.4307,203.6834,180.7371,201.9615,180%
,193.9881,176.3678,184.0585,171.3529,174.0148,165.7337,163.9766,159.5619%
,154.061,152.8992,150,150)
\curve(150,150,144.3814,145.8167,135.0459,138.394,126.1558,130.7181%
,117.8047,122.8823,110.0773,114.9851,103.0479,107.1285,96.7804,99.4174%
,91.3269,91.957,90,90,86.7277,84.8524,83.0105,78.2064%
,80.1907,72.1185,78.2711,66.6829,77.2423,61.9876,77.0829,58.1129%
,77.7602,55.1301,79.2309,53.1005,81.4416,52.074,84.3302,52.0891%
,87.8269,53.1712,91.8552,55.3327,96.3333,58.5726,98.0385,60%
,101.1753,62.876,106.2929,68.2145,111.5964,74.5461,116.9962,81.8156%
,122.4044,89.9554,127.7359,98.8862,132.9097,108.5174,137.8502,118.7489%
,142.4881,129.4718,146.7615,140.5698,150,150)
\curve(150,150,150.617,151.921,154.01,163.3987%
,156.9053,174.8737,159.278,186.2154,161.1133,197.2938,162.4065,207.9811%
,163.1635,218.1532,163.3999,227.6913,163.1412,236.4836,162.4216,244.4266%
,161.2839,251.4266,159.7785,257.4007,157.9622,262.278,155.8975,266.0005%
,153.6513,268.524,151.2936,269.8182,150,270,148.8967,269.8679%
,146.5333,268.6724,144.2757,266.2459,142.194,262.6175,140.3556,257.8302%
,138.8232,251.941,137.6543,245.0198,136.8998,237.1485,136.6029,228.4202%
,136.7989,218.9375,137.5137,208.8116,138.7639,198.1609,140.556,187.1089%
,142.8863,175.7835,145.7408,164.3143,149.0953,152.8321,150,150)
\curve(150,150,152.9155,141.4661%
,157.1575,130.3434,161.7685,119.5862,166.6873,109.3115,171.8453,99.6287%
,177.1671,90.6388,182.5723,82.4329,187.976,75.0914,193.2904,68.683%
,198.4261,63.2637,201.9615,60,203.2933,58.8766,207.8036,55.5513%
,211.8707,53.3037,215.4127,52.1359,218.3524,52.0367,220.6194,52.9814%
,222.1511,54.9328,222.8933,57.8418,222.8019,61.648,221.8433,66.2807%
,219.9951,71.6605,217.2471,77.6999,213.6009,84.305,210,90%
,209.0711,91.3768,203.6843,98.8127,197.4799,106.5078,190.509,114.3566%
,182.8345,122.2544,174.5302,130.0987,165.6797,137.7908,156.376,145.237,150,150)
\curve(150,150,146.7199,152.3496,136.8191,159.0484,126.7864,165.2617,116.7388,170.927%
,106.7956,175.9916,98.0385,180,97.0772,180.4136,87.7031,184.1619%
```

```
,78.7906,187.2167,70.453,189.5694,62.7985,191.2226,55.9281,192.1897%
,49.9348,192.4949,44.9018,192.1718,40.9017,191.2634,37.9953,189.821%
,36.2306,187.9032,35.6424,185.5746,36.2512,182.9052,38.0633,179.9685%
,41.0707,176.8408,45.2505,173.5993,50.5657,170.3213,56.9651,167.0826%
,64.3843,163.9566,72.7464,161.0122,81.9625,158.3139,91.9331,155.9195%
,102.5495,153.8802,113.6948,152.239,125.2453,151.0302,137.0726,150.2792%
,149.0444,150.0015,150,150)
\put(230,60){\makebox(0,0)[l]{{\scriptsize$f_5$}}}
}
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
\put(1050,330){\thinlines             %31
\put(150,0){\line(0,1){300}}\put(0,150){\line(1,0){300}}
\put(160,300){\makebox(0,0)[lt]{{\scriptsize$y$}}}
\put(300,160){\makebox(0,0)[br]{{\scriptsize$x$}}}
\put(140,30){\makebox(0,0)[r]{{\scriptsize$-a$}}}
%\put(140,140){\makebox(0,0)[rt]{{\scriptsize$0$}}}
\put(140,270){\makebox(0,0)[r]{{\scriptsize$a$}}}
\put(25,140){\makebox(0,0)[tr]{{\scriptsize$-a$}}}
\put(275,140){\makebox(0,0)[tl]{{\scriptsize$a$}}}
\multiput(30,145)(240,0){2}{\line(0,1){10}}
\multiput(145,30)(0,240){2}{\line(1,0){10}}
\cervena
\thicklines
\curve(150,150,167.843,151.7903,184.7555,157.0453,199.8646,165.4249%
,212.4084,176.3859,221.7833,189.2154,223.4847,192.4264,227.5809,203.076%
,229.613,217.0571,228.3938,228.3938,227.9229,230.2325,222.7823,241.7172%
,214.6739,250.7236,210,253.923,204.2609,256.6096,192.3457,258.9197%
,179.8195,257.4128,167.6061,252.0779,156.6046,243.1349,150,234.8528%
,147.6332,231.021,141.3775,216.3642,138.3478,199.9443,138.8474,182.6449%
,142.9528,165.3984,150,150)
\curve(150,150,132.157,151.7903,115.2445,157.0453,100.1354,165.4249%
,87.5916,176.3859,78.2167,189.2154,76.5153,192.4264,72.4191,203.076%
,70.387,217.0571,71.6062,228.3938,72.0771,230.2325,77.2177,241.7172%
,85.3261,250.7236,90,253.923,95.7391,256.6096,107.6543,258.9197%
,120.1805,257.4128,132.3939,252.0779,143.3954,243.1349,150,234.8528%
,152.3668,231.021,158.6225,216.3642,161.6522,199.9443,161.1526,182.6449%
,157.0472,165.3984,150,150)
\curve(150,150,150.5093,149.1291,161.14,134.6956,174.2691,122.8377%
,182.4718,117.5282,189.1574,114.1312,204.9483,108.9524,220.7207,107.4547%
,223.4847,107.5736,235.546,109.56,248.5462,114.9639,258.9476,123.1547%
,266.1297,133.4461,269.663,145.02,270,150,269.3359,156.978%
,265.1682,168.3976,257.4091,178.39,246.5226,186.156,233.158,191.0357%
,223.4847,192.4264,218.1099,192.5505,202.2689,190.433,186.5664,184.6439%
,182.4718,182.4718,171.9166,175.3755,159.1598,163.0393,150,150)
\curve(150,150,149.4907,149.1291,138.86,134.6956,125.7309,122.8377%
,117.5282,117.5282,110.8426,114.1312,95.0517,108.9524,79.2793,107.4547%
,76.5153,107.5736,64.454,109.56,51.4538,114.9639,41.0524,123.1547%
,33.8703,133.4461,30.337,145.02,30,150,30.6641,156.978%
,34.8318,168.3976,42.5909,178.39,53.4774,186.156,66.842,191.0357%
,76.5153,192.4264,81.8901,192.5505,97.7311,190.433,113.4336,184.6439%
,117.5282,182.4718,128.0834,175.3755,140.8402,163.0393,150,150)
\curve(150,150,149.0108,148.2414,142.0141,131.7453,138.5104,114.4244%
,138.6159,97.2082,142.2152,81.0252,148.9685,66.745,150,65.1472%
,158.3334,55.1251,169.5987,46.7639,181.929,42.0635,194.417,41.2055%
,206.1401,44.1399,210,46.077,216.2185,50.5879,223.8699,60.0604%
,228.3938,71.6062,228.4586,71.8879,229.5357,85.2624,226.8671,99.2884%
,223.4847,107.5736,220.4487,113.038,210.5067,125.6091,197.4845,136.1817%
,182.0152,144.0688,164.8829,148.7591,150,150)
\curve(150,150,150.9892,148.2414,157.9859,131.7453,161.4896,114.4244%
,161.3841,97.2082,157.7848,81.0252,151.0315,66.745,150,65.1472%
,141.6666,55.1251,130.4013,46.7639,118.071,42.0635,105.583,41.2055%
,93.8599,44.1399,90,46.077,83.7815,50.5879,76.1301,60.0604%
,71.6062,71.6062,71.5414,71.8879,70.4643,85.2624,73.1329,99.2884%
,76.5153,107.5736,79.5513,113.038,89.4933,125.6091,102.5155,136.1817%
,117.9848,144.0688,135.1171,148.7591,150,150)
\put(230,60){\makebox(0,0)[l]{{\scriptsize$f_{\frac32}$}}}
}
%%%%%%%%%%%%%%%%%%%%%%
\put(1400,330){\thinlines             %33
\put(150,0){\line(0,1){300}}\put(0,150){\line(1,0){300}}
\put(160,300){\makebox(0,0)[lt]{{\scriptsize$y$}}}
\put(300,160){\makebox(0,0)[br]{{\scriptsize$x$}}}
\put(140,25){\makebox(0,0)[rt]{{\scriptsize$-a$}}}
\put(140,270){\makebox(0,0)[r]{{\scriptsize$a$}}}
\put(25,140){\makebox(0,0)[tr]{{\scriptsize$-a$}}}
\put(275,140){\makebox(0,0)[tl]{{\scriptsize$a$}}}
\multiput(30,145)(240,0){2}{\line(0,1){10}}
\multiput(145,30)(0,240){2}{\line(1,0){10}}
\cervena
\thicklines
\curve(150,150,159.9759,150.4992,169.8081,151.9874,179.3551,154.4366%
,188.4807,157.8004,197.056,162.0154,204.9615,167.0016,212.0898,172.6645%
```

```
,218.3468,178.8965,223.5377,185.4139,223.6536,185.5787,227.948,192.5832%
,231.1853,199.7752,233.3395,207.0156,234.0755,211.0844,234.4031,214.1636%
,234.3876,221.0787,233.3234,227.6238,231.2587,233.6671,228.2591,239.0849%
,224.6096,243.5574,224.4063,243.7638,219.7965,247.6022,214.5385,250.5128%
,209.0885,252.3442,208.7524,252.4239,202.5664,253.2804,196.1157,253.0453%
,189.5389,251.7001,182.9765,249.2452,182.114,248.8367,176.5678,245.6999%
,170.8769,241.4675,170.4484,241.1021,164.7481,235.5078,159.5884,228.9898%
,155.0801,221.6368,151.3218,213.5515,150,210,148.3977,204.8493%
,146.3763,195.6557,145.309,186.1046,145.2294,176.3355,146.0202,167.4367%
,146.1525,166.4915,148.0744,156.7166,150,150)
\curve(150,150,150.9726,147.153,154.8062,137.9389,159.5165,129.206%
,165.0283,121.0772,170.5212,114.4562,171.251,113.6641,178.0803,107.0657%
,185.4003,101.3663,192.1469,97.1494,193.0848,96.634,201.0004,92.9197%
,209.0084,90.256,216.9674,88.6569,224.7356,88.1177,232.1736,88.6145%
,234.0755,88.9156,239.1467,90.1055,245.5274,92.531,251.1977,95.8151%
,255.4056,99.2394,256.0509,99.8668,259.9939,104.5816,262.9485,109.8434%
,264.8532,115.527,265.6639,121.4998,265.3549,127.6244,263.9193,133.7612%
,261.3695,139.7708,257.7361,145.5164,253.923,150,253.0685,150.8666%
,247.4331,155.6973,240.9127,159.8944,233.6048,163.3555,225.6201,165.992%
,217.0801,167.7304,208.1157,168.5141,198.8642,168.3038,189.4672,167.079%
,181.8678,165.3467,180.0682,164.8376,170.8098,161.5967,161.8315,157.3915%
,153.2671,152.2757,150,150)
\curve(150,150,145.2421,146.3195,137.8722,139.6094,131.2605,132.2457%
,125.4961,124.3417,120.6526,116.021,117.5373,109.2931,116.7866,107.4155%
,113.9369,98.6632,112.1238,89.906,111.4327,83.1996,111.3486,81.2864%
,111.5941,72.9458,112.8242,65.0217,114.9852,57.6451,117.886,51.1633%
,118.0068,50.9386,121.8026,45.0137,125.1433,41.0958,126.2728,39.9692%
,131.3051,35.8895,136.7771,32.8429,142.5586,30.8804,148.5137,30.0348%
,150,30,154.5034,30.3204,160.3881,31.7324,166.0302,34.247%
,171.2962,37.8223,174.8567,41.0958,176.0597,42.3982,180.203,47.8983%
,182.114,51.1633,183.6199,54.2307,186.2172,61.2899,187.9165,68.9585%
,188.6555,77.1096,188.5673,83.1996,188.3894,85.6084,187.0917,94.3152%
,184.7543,103.0878,182.4627,109.2931,181.3882,111.7835,177.0232,120.2623%
,171.707,128.3889,165.505,136.0351,158.4987,143.0825,150.7847,149.4241,150,150)
\curve(150,150,142.4724,154.9662,133.683,159.6304,124.5463,163.3547%
,118.1322,165.3467,115.1992,166.0947,105.7833,167.8242,96.4418,168.5358%
,87.3177,168.241,78.5506,166.9697,70.2748,164.7701,62.617,161.7074%
,55.6933,157.8631,49.608,153.3328,46.077,150,44.4514,148.2251%
,40.2983,142.6594,37.2065,136.7638,35.216,130.6727,34.3485,124.5246%
,34.6063,118.4592,35.9732,112.6154,38.4141,107.1284,41.8761,102.1273%
,44.5944,99.2394,46.289,97.7332,51.5669,94.0565,57.6096,91.195%
,64.3046,89.2324,65.9245,88.9156,71.5287,88.2366,79.1504,88.2583%
,87.0325,89.3303,95.0339,91.467,103.0129,94.6636,107.8531,97.1494%
,110.829,98.8967,118.3459,104.1243,125.4335,110.2868,129.4788,114.4562%
,131.9707,117.3076,137.847,125.095,142.9648,133.5432,147.2413,142.5348,150,150)
\curve(150,150,150.6092,151.9421,153.019,161.6299,153.9798,167.4367%
,154.4387,171.4576,154.8553,181.2818,154.2744,190.9587,152.7204,200.3466%
,150.2361,209.3086,150,210,146.8817,217.7147,142.7336,225.4442%
,137.8836,232.388,132.4366,238.4502,129.1231,241.4675,126.5092,243.5499%
,120.2272,247.6226,117.886,248.8367,113.7237,250.6215,107.1365,252.5178%
,100.6058,253.3019,94.2715,252.9829,90.9115,252.3442,88.2707,251.5886%
,82.7354,249.1654,77.79,245.7768,75.3904,243.5574,73.5492,241.5026%
,70.1157,236.4375,67.5785,230.6892,66.0113,224.3768,65.4711,217.6282%
,65.9245,211.0844,65.9974,210.5782,67.6108,203.366,70.3135,196.1324%
,74.0886,189.0178,76.4623,185.4139,78.9004,182.1595,84.6953,175.6889%
,91.4026,169.7298,98.9357,164.3955,107.1933,159.7874,116.0617,155.9928%
,125.4165,153.0835,135.1248,151.1144,145.0473,150.1227,150,150)
\put(242.5,62.5){\makebox(0,0)[l]{{\scriptsize$f_{\frac53}$}}}
}
%%%%%%%%%%%%%%%%%%%%
\put(0,0){\thinlines              %34
\put(150,0){\line(0,1){300}}\put(0,150){\line(1,0){300}}
\put(160,300){\makebox(0,0)[lt]{{\scriptsize$y$}}}
\put(300,160){\makebox(0,0)[br]{{\scriptsize$x$}}}
\put(140,30){\makebox(0,0)[rt]{{\scriptsize$-a$}}}
\put(140,270){\makebox(0,0)[rb]{{\scriptsize$a$}}}
\put(30,140){\makebox(0,0)[tr]{{\scriptsize$-a$}}}
\put(270,140){\makebox(0,0)[tl]{{\scriptsize$a$}}}
\multiput(30,145)(240,0){2}{\line(0,1){10}}
\multiput(145,30)(0,240){2}{\line(1,0){10}}
\cervena
\thicklines
\curve(150,150,157.9541,150.7981,165.6346,153.1693,172.7755,157.0453%
,179.1259,162.3142,184.4568,168.8239,188.5681,176.3859,191.2934,184.7809%
,192.5052,193.765,192.1185,203.076,190.0928,212.4408,186.4337,221.5835%
,181.1927,230.2325,174.4657,238.128,166.3904,245.0299,157.1428,250.7236%
,146.932,255.0266,135.9947,257.7935,124.5887,258.9197,112.9856,258.3447%
,101.4637,256.0537,90.2999,252.0779,79.7624,246.4941,70.103,239.4218%
,61.5505,231.021,54.3042,221.4869,48.5286,211.0448,44.3486,199.9443%
,41.8462,188.4519,41.0585,176.8438,41.9763,165.3984,44.5447,154.3887%
,46.077,150,48.6645,144.0745,54.1951,134.6956,60.9583,126.4648%
,68.7434,119.5624,77.3127,114.1312,86.4088,110.2725,95.7611,108.0432%
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,105.0937,107.4547,114.1328,108.4722,122.6145,111.0161,130.2922,114.9639%
,136.9431,120.154,142.3748,126.3899,146.4303,133.4461,148.9926,141.074%
,149.9877,149.009,150,150)
\curve(150,150,142.0459,149.2019,134.3654,146.8307,127.2245,142.9547%
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,107.4948,106.235,107.8815,96.924,109.9072,87.5592,113.5663,78.4165%
,118.8073,69.7675,125.5343,61.872,133.6096,54.9701,142.8572,49.2764%
,153.068,44.9734,164.0053,42.2065,175.4113,41.0803,187.0144,41.6553%
,198.5363,43.9463,209.7001,47.9221,220.2376,53.5059,229.897,60.5782%
,238.4495,68.979,245.6958,78.5131,251.4714,88.9552,255.6514,100.0557%
,258.1538,111.5481,258.9415,123.1562,258.0237,134.6016,255.4553,145.6113%
,253.923,150,251.3355,155.9255,245.8049,165.3044,239.0417,173.5352%
,231.2566,180.4376,222.6873,185.8688,213.5912,189.7275,204.2389,191.9568%
,194.9063,192.5453,185.8672,191.5278,177.3855,188.9839,169.7078,185.0361%
,163.0569,179.846,157.6252,173.6101,153.5697,166.5539,151.0074,158.926%
,150.0123,150.991,150,150)
\curve(150,150,157.9541,149.2019,165.6346,146.8307,172.7755,142.9547%
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,192.5052,106.235,192.1185,96.924,190.0928,87.5592,186.4337,78.4165%
,181.1927,69.7675,174.4657,61.872,166.3904,54.9701,157.1428,49.2764%
,146.932,44.9734,135.9947,42.2065,124.5887,41.0803,112.9856,41.6553%
,101.4637,43.9463,90.2999,47.9221,79.7624,53.5059,70.103,60.5782%
,61.5505,68.979,54.3042,78.5131,48.5286,88.9552,44.3486,100.0557%
,41.8462,111.5481,41.0585,123.1562,41.9763,134.6016,44.5447,145.6113%
,46.077,150,48.6645,155.9255,54.1951,165.3044,60.9583,173.5352%
,68.7434,180.4376,77.3127,185.8688,86.4088,189.7275,95.7611,191.9568%
,105.0937,192.5453,114.1328,191.5278,122.6145,188.9839,130.2922,185.0361%
,136.9431,179.846,142.3748,173.6101,146.4303,166.5539,148.9926,158.926%
,149.9877,150.991,150,150)
\curve(150,150,142.0459,150.7981,134.3654,153.1693,127.2245,157.0453%
,120.8741,162.3142,115.5432,168.8239,111.4319,176.3859,108.7066,184.7809%
,107.4948,193.765,107.8815,203.076,109.9072,212.4408,113.5663,221.5835%
,118.8073,230.2325,125.5343,238.128,133.6096,245.0299,142.8572,250.7236%
,153.068,255.0266,164.0053,257.7935,175.4113,258.9197,187.0144,258.3447%
,198.5363,256.0537,209.7001,252.0779,220.2376,246.4941,229.897,239.4218%
,238.4495,231.021,245.6958,221.4869,251.4714,211.0448,255.6514,199.9443%
,258.1538,188.4519,258.9415,176.8438,258.0237,165.3984,255.4553,154.3887%
,253.923,150,251.3355,144.0745,245.8049,134.6956,239.0417,126.4648%
,231.2566,119.5624,222.6873,114.1312,213.5912,110.2725,204.2389,108.0432%
,194.9063,107.4547,185.8672,108.4722,177.3855,111.0161,169.7078,114.9639%
,163.0569,120.154,157.6252,126.3899,153.5697,133.4461,151.0074,141.074%
,150.0123,149.009,150,150)
\put(250,60){\makebox(0,0)[l]{{\scriptsize$f_{\frac23}$}}}
}
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
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\put(160,300){\makebox(0,0)[lt]{{\scriptsize$y$}}}
\put(300,160){\makebox(0,0)[br]{{\scriptsize$x$}}}
\put(140,25){\makebox(0,0)[rt]{{\scriptsize$-a$}}}
\put(140,275){\makebox(0,0)[rb]{{\scriptsize$a$}}}
\put(25,140){\makebox(0,0)[tr]{{\scriptsize$-a$}}}
\put(275,140){\makebox(0,0)[tl]{{\scriptsize$a$}}}
\multiput(30,145)(240,0){2}{\line(0,1){10}}
\multiput(145,30)(0,240){2}{\line(1,0){10}}
\cervena
\thicklines
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,173.5421,166.106,174.1433,167.5411,176.2993,177.0787,176.2894,182.9659%
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\curve(150,150,140.6014,151.9052,132.391,157.445,130.6951,159.2968%
,126.4579,166.106,125.8567,167.5411,123.7007,177.0787,123.7106,182.9659%
,124.7516,189.3221,125.5958,192.2693,129.9205,201.6475,132.1356,204.981%
,136.3043,210.0048,139.1659,212.8149,150,220.5342)
\curve(150,150,140.6014,148.0948,132.391,142.555,130.6951,140.7032%
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,136.3043,89.9952,139.1659,87.1851,150,79.4658)
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,163.6957,89.9952,160.8341,87.1851,150,79.4658)
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,105.4113,227.2299,104.8884,227.1339,95.5703,224.7768,91.5043,223.3513%
,86.3892,221.1941,77.512,216.4,69.1033,210.4316,68.0309,209.554%
,61.3219,203.3485,54.7933,195.8491,54.3176,195.2317,48.2286,186.1828%
,43.1787,176.3213,39.2746,165.7835,36.6041,154.7192,35.8732,150)
\curve(150,79.4658,152.0925,78.3671,159.722,75.1738,167.5686,73.0269%
,167.9776,72.9432,175.3844,71.8748,176.7265,71.7688,185.8231,71.7252%
,194.5887,72.7701,195.1116,72.8661,204.4297,75.2232,208.4957,76.6487%
```

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,105.4113,72.7701,104.8884,72.8661,95.5703,75.2232,91.5043,76.6487%
,86.3892,78.8059,77.512,83.6,69.1033,89.5684,68.0309,90.446%
,61.3219,96.6515,54.7933,104.1509,54.3176,104.7683,48.2286,113.8172%
,43.1787,123.6787,39.2746,134.2165,36.6041,145.2808,35.8732,150)
\curve(150,220.5342,152.0925,221.6329,159.722,224.8262,167.5686,226.9731%
,167.9776,227.0568,175.3844,228.1252,176.7265,228.2312,185.8231,228.2748%
,194.5887,227.2299,195.1116,227.1339,204.4297,224.7768,208.4957,223.3513%
,213.6108,221.1941,222.488,216.4,230.8967,210.4316,231.9691,209.554%
,238.6781,203.3485,245.2067,195.8491,245.6824,195.2317,251.7714,186.1828%
,256.8213,176.3213,260.7254,165.7835,263.3959,154.7192,264.1268,150)
\curve(35.8732,150,35.2341,143.2892,35.2096,131.6627,36.5523,120.0138%
,39.2603,108.5185,42.8622,98.4052,43.3082,97.3511,48.6472,86.6816%
,53.1095,79.605,55.2063,76.6718,62.8932,67.4729,71.5962,59.2224%
,75.2566,56.2747,81.1862,52.0418,90.3287,46.6463,91.5191,46.0339%
,102.4385,41.2815,113.5748,37.8947,113.7782,37.8456,123.967,35.9419%
,125.366,35.7642,137.0264,35.0519,148.5839,35.6996,150,35.8732)
\curve(264.1268,150,264.7659,156.7108,264.7904,168.3373,263.4477,179.9862%
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,246.8905,220.395,244.7937,223.3282,237.1068,232.5271,228.4038,240.7776%
,224.7434,243.7253,218.8138,247.9582,209.6713,253.3537,208.4809,253.9661%
,197.5615,258.7185,186.4252,262.1053,186.2218,262.1544,176.033,264.0581%
,174.634,264.2358,162.9736,264.9481,151.4161,264.3004,150,264.1268)
\curve(35.8732,150,35.2341,156.7108,35.2096,168.3373,36.5523,179.9862%
,39.2603,191.4815,42.8622,201.5948,43.3082,202.6489,48.6472,213.3184%
,53.1095,220.395,55.2063,223.3282,62.8932,232.5271,71.5962,240.7776%
,75.2566,243.7253,81.1862,247.9582,90.3287,253.3537,91.5191,253.9661%
,102.4385,258.7185,113.5748,262.1053,113.7782,262.1544,123.967,264.0581%
,125.366,264.2358,137.0264,264.9481,148.5839,264.3004,150,264.1268)
\curve(264.1268,150,264.7659,143.2892,264.7904,131.6627,263.4477,120.0138%
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,246.8905,79.605,244.7937,76.6718,237.1068,67.4729,228.4038,59.2224%
,224.7434,56.2747,218.8138,52.0418,209.6713,46.6463,208.4809,46.0339%
,197.5615,41.2815,186.4252,37.8947,186.2218,37.8456,176.033,35.9419%
,174.634,35.7642,162.9736,35.0519,151.4161,35.6996,150,35.8732)
\curve(150,35.8732,159.8662,37.675,170.7076,40.9228,174.5537,42.4232%
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,201.9615,60,206.7418,64.815,212.4417,71.7005,213.3208,72.9044%
,218.7548,81.5488,222.9946,90.5865,224.803,95.6524,226.0137,99.8514%
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,98.0385,240,93.2582,235.185,87.5583,228.2995,86.6792,227.0956%
,81.2452,218.4512,77.0054,209.4135,75.197,204.3476,73.9863,200.1486%
,72.1914,190.8236,71.8541,187.6331,71.6009,181.6035,72.1728,172.6482%
,73.8437,164.1089,76.53,156.1258,79.4658,150)
\curve(150,264.1268,159.8662,262.325,170.7076,259.0772,174.5537,257.5768%
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,201.9615,240,206.7418,235.185,212.4417,228.2995,213.3208,227.0956%
,218.7548,218.4512,222.9946,209.4135,224.803,204.3476,226.0137,200.1486%
,227.8086,190.8236,228.1459,187.6331,228.3991,181.6035,227.8272,172.6482%
,226.1563,164.1089,223.47,156.1258,220.5342,150)
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,81.2452,81.5488,77.0054,90.5865,75.197,95.6524,73.9863,99.8514%
,72.1914,109.1764,71.8541,112.3669,71.6009,118.3965,72.1728,127.3518%
,73.8437,135.8911,76.53,143.8742,79.4658,150)
\curve(220.5342,150,215.4734,157.6832,204.8272,167.9755,196.9099,172.5906%
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,168.8798,174.6309,162.4747,171.6068,159.504,169.4764,154.6476,164.3039%
,153.0579,161.7797,152.3936,160.487,150.1398,152.5871,150,150)
\curve(79.4658,150,84.5266,142.3168,95.1728,132.0245,103.0901,127.4094%
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,131.1202,125.3691,137.5253,128.3932,140.496,130.5236,145.3524,135.6961%
,146.9421,138.2203,147.6064,139.513,149.8602,147.4129,150,150)
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,168.8798,125.3691,162.4747,128.3932,159.504,130.5236,154.6476,135.6961%
,153.0579,138.2203,152.3936,139.513,150.1398,147.4129,150,150)
\curve(79.4658,150,84.5266,157.6832,95.1728,167.9755,103.0901,172.5906%
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,131.1202,174.6309,137.5253,171.6068,140.496,169.4764,145.3524,164.3039%
,146.9421,161.7797,147.6064,160.487,149.8602,152.5871,150,150)
\put(242.5,60){\makebox(0,0)[l]{{\scriptsize$f_{\frac25}$}}}
}
%%%%%%%%%%%%%%%%%%%%
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\put(160,300){\makebox(0,0)[lt]{{\scriptsize$y$}}}
\put(300,160){\makebox(0,0)[br]{{\scriptsize$x$}}}
\put(140,30){\makebox(0,0)[r]{{\scriptsize$-a$}}}
\put(140,140){\makebox(0,0)[rt]{{\scriptsize$0$}}}
\put(140,275){\makebox(0,0)[rb]{{\scriptsize$a$}}}
\put(25,140){\makebox(0,0)[tr]{{\scriptsize$-a$}}}
\put(275,140){\makebox(0,0)[tl]{{\scriptsize$a$}}}
\multiput(30,145)(240,0){2}{\line(0,1){10}}
\multiput(145,30)(0,240){2}{\line(1,0){10}}
\cervena
\thicklines
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,171.3898,205.0179,166.9732,211.1393,161.5165,216.7712,155.0887,221.758%
,147.7812,225.9547,139.7058,229.2306,130.9925,231.4713,121.7871,232.582%
,112.2484,232.4888,102.5449,231.141,92.8514,228.5121,83.3457,224.6004%
,74.2051,219.4292,65.6025,213.0468,57.7032,205.5254,50.6615,196.9601%
,44.6174,187.4666,39.6943,177.1799,35.9958,166.2509,33.6039,154.844,33.0087,150)
\curve(150,150,148.4301,146.7828,146.9789,141.8249,146.5238,136.6086%
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,184.7145,103.9559,192.1621,104.3792,199.7564,105.9379,207.3292,108.6572%
,214.7098,112.538,221.7278,117.5564,228.2173,123.6642,234.0202,130.7895%
,238.9893,138.8381,242.9914,147.6954,243.8198,150,245.9106,157.2282%
,247.6501,167.2877,248.1347,177.7121,247.3124,188.3297,245.1556,198.9626%
,241.6615,209.4298,236.8531,219.551,230.7778,229.1503,223.5076,238.0593%
,215.1371,246.1207,208.4957,251.3175)
\curve(150,150,149.178,151.3288,145.9229,155.3191,141.9025,158.623%
,137.2331,161.1257,132.047,162.7307,126.4893,163.3621,120.7153,162.966%
,114.8869,161.5121,109.1692,158.9941,103.7271,155.4301,98.7217,150.8623%
,97.934,150,94.3067,145.3564,90.6254,139.0001,87.8074,131.9016%
,85.966,124.1872,85.1953,115.9992,85.5685,107.4926,87.1361,98.8323%
,89.9244,90.1897,93.9355,81.7391,99.146,73.6543,105.5085,66.1049%
,112.9512,59.253,121.3801,53.2499,130.6801,48.2325,140.7176,44.3213%
,151.3428,41.6171,162.3926,40.1994,173.6937,40.1243,185.0663,41.4235%
,196.3269,44.1038,207.2927,48.1462,208.4957,48.6825)
\curve(33.0087,150,32.5775,143.1339,32.9508,131.3019,34.7327,119.5329%
,37.9067,108.0115,42.431,96.9183,48.2393,86.4267,55.2422,76.6996%
,63.3288,67.8856,72.3689,60.117,82.2153,53.5067,92.7073,48.1462%
,103.6731,44.1038,114.9337,41.4235,126.3063,40.1243,137.6074,40.1994%
,148.6572,41.6171,159.2824,44.3213,169.3199,48.2325,178.6199,53.2499%
,187.0488,59.253,194.4915,66.1049,200.854,73.6543,206.0645,81.7391%
,210.0756,90.1897,212.8639,98.8323,214.4315,107.4926,214.8047,115.9992%
,214.034,124.1872,212.1926,131.9016,209.3746,139.0001,205.6933,145.3564%
,202.066,150,201.2783,150.8623,196.2729,155.4301,190.8308,158.9941%
,185.1131,161.5121,179.2847,162.966,173.5107,163.3621,167.953,162.7307%
,162.7669,161.1257,158.0975,158.623,154.0771,155.3191,150.822,151.3288,150,150)
\curve(208.4957,251.3175,205.7822,253.1915,195.5777,259.1456,184.6746,263.8764%
,173.2377,267.2991,161.4419,269.3522,149.4689,269.9986,137.5042,269.2268%
,125.7328,267.0507,114.3363,263.5093,103.4886,258.6665,93.3534,252.609%
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}
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\put(160,300){\makebox(0,0)[lt]{{\scriptsize$y$}}}
\put(300,160){\makebox(0,0)[br]{{\scriptsize$x$}}}
\put(140,25){\makebox(0,0)[rt]{{\scriptsize$-a$}}}
\put(140,275){\makebox(0,0)[rb]{{\scriptsize$a$}}}
\put(25,140){\makebox(0,0)[tr]{{\scriptsize$-a$}}}
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\thicklines
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,202.9407,95.4902,202.0034,84.4675,199.0146,73.6642,194.0482,63.4559%
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,153.4345,267.5729,165.3616,268.232,177.2536,266.8161,188.73,263.3665%
,199.4244,257.9943,208.9972,250.8761,217.1472,242.2483,223.622,232.3987%
,228.2268,221.6569,230.8309,210.3825,231.3723,198.9533,229.8597,187.7519%
,226.3724,177.1527,221.0573,167.5089,214.1242,159.1407,205.8383,152.3238%
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}
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,117.054,225.3097,128.3905,216.9101,137.9289,205.9778,145.1471,192.9977%
,149.6461,178.5604,151.171,163.3316,150,150)
\curve(150,150,149.6237,148.0177,145.0686,133.3292,137.7289,119.9432%
,127.9752,108.4692,116.3063,99.4165,103.3228,93.1687,89.6965,89.9628%
,76.135,89.8781,63.345,92.831,51.9956,98.5804,42.6835,106.7396%
,35.902,116.7968,32.0151,128.1419,31.2388,140.098,33.0087,150%
,33.6297,151.9569,39.0822,163.0161,47.3338,172.615,57.9788,180.1699%
,70.4896,185.2038,84.2438,187.3719,98.5565,186.4792,112.7164,182.4908%
,126.0222,175.5338,137.8195,165.8909,147.5346,153.9855,150,150)
\curve(150,150,154.7041,140.3599,158.9995,125.6471,160.2439,110.538%
,158.4209,95.7453,153.6761,81.9669,146.309,69.8493,136.7574,59.9542%
,125.5748,52.7291,113.4013,48.4844,100.9305,47.3773,88.8733,49.4032%
,77.9207,54.3965,68.7079,62.0393,61.7815,71.8775,57.5704,83.3447%
,56.3642,95.792,58.2972,108.5214,63.3422,120.8223,71.3113,132.0085%
,81.8658,141.4539,94.5337,148.6254,97.934,150,108.7344,153.11%
,123.8084,154.6369,139.0522,153.0915,150,150)
\put(242.5,60){\makebox(0,0)[l]{{\scriptsize$f_{\frac97}$}}}
}
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
\end{picture}
\caption{Rovinná krivka s menom ruža}
\label{picture15}
\end{center}
\end{figure}
```

Numerické integrovanie Simpsonovou metódou, objem anuloidu a objem rotačného telesa vzniknutého rotáciou trojuholníkov okolo osi y

```
%.........................................................................
\begin{figure}[ht]
\begin{center}
\setlength{\unitlength}{0.04mm}%
\begin{picture}(1000,800)
\zlta\linethickness{4mm}\put(150,100){\line(0,1){330}}
\put(250,100){\line(0,1){580}}\put(350,100){\line(0,1){500}}\put(450,100){\line(0,1){390}}
\put(770,100){\line(0,1){289.167}}\put(870,100){\line(0,1){244}}
\linethickness{.4mm}
\multiput(0,-10)(0,-10){24}{\curve(110,464,120,498.4,140,557.6,160,607.6%
,180,648.4,200,680,220,702.4,240,715.6,260,719.6,280,714.4,300,700)}
\multiput(0,-10)(0,-10){10}{\curve(300,700,320,680.8,340,661.2,360,641.2%
,380,620.8,400,600,420,578.8,440,557.2,460,535.2,480,512.8,500,490)}
\multiput(0,-10)(0,-10){5}{\curve(720,389.167,740,395.56472,760,399.54688,780,401.11348%
,800,400.26452,820,397,840,391.31992,860,383.22428,880,372.71308,900,359.78632,920,344.444)}
%
\modra\thinlines\linethickness{.25pt}
\multiput(100,100)(0,50){7}{\curve(200,50,0,0)}
\put(100,450){\curve(200,50,8,2)}\put(100,500){\curve(200,50,28,7)}\put(100,550){\curve(200,50,48,12)}
\put(100,600){\curve(200,50,64,16)}\put(100,650){\curve(200,50,96,24)}
\multiput(300,125)(0,50){7}{\curve(200,50,0,0)}
\put(400,100){\curve(100,25,0,0)}\put(300,475){\curve(172,43,0,0)}\put(300,525){\curve(136,34,0,0)}
\put(300,575){\curve(100,25,0,0)}\put(300,625){\curve(60,15,0,0)}\put(300,675){\curve(20,5,0,0)}
\multiput(720,100)(0,50){5}{\curve(200,50,0,0)}
\put(720,350){\curve(140,35,0,0)}
%
\cierna\thinlines
\put(0,100){\line(1,0){1000}}\put(40,80){\line(0,1){720}}
\put(25,800){\makebox(0,0)[tr]{{\scriptsize $y$}}}
\put(1000,120){\makebox(0,0)[br]{{\scriptsize $x$}}}
```

```
\dottedline{20}(820,100)(820,10)
\put(900,700){\makebox(0,0)[rt]{{\scriptsize $n$ je párne}}}
%
\thinlines
\put(100,-70){\vector(0,1){80}}\put(100,-70){\line(1,0){300}}
\put(430,-80){\makebox(0,0)[bl]{{\scriptsize $a$}}}
\put(920,-70){\vector(0,1){80}}\put(920,-70){\line(-1,0){300}}
\put(590,-80){\makebox(0,0)[br]{{\scriptsize $b$}}}
\thicklines
\put(100,90){\line(0,1){20}}\put(100,60){\makebox(0,0)[t]{{\scriptsize $x_0$}}}
\put(200,90){\line(0,1){20}}\put(200,60){\makebox(0,0)[t]{{\scriptsize $x_1$}}}
\put(300,90){\line(0,1){20}}\put(300,60){\makebox(0,0)[t]{{\scriptsize $x_2$}}}
\put(400,90){\line(0,1){20}}\put(400,60){\makebox(0,0)[t]{{\scriptsize $x_3$}}}
\put(500,90){\line(0,1){20}}\put(500,60){\makebox(0,0)[t]{{\scriptsize $x_4$}}}
\put(720,90){\line(0,1){20}}\put(700,60){\makebox(0,0)[t]{{\scriptsize $x_{n\!-\!2}$}}}
\put(820,90){\line(0,1){20}}\put(800,0){\makebox(0,0)[t]{{\scriptsize $x_{n\!-\!1}$}}}
\put(920,90){\line(0,1){20}}\put(920,60){\makebox(0,0)[t]{{\scriptsize $x_n$}}}
%
\thinlines\cervena
\curve(60,347.500,70,385.737,80,411.429,90,425.781,100,430,110,434.710,120,447.143,130,466.094%
,140,490.357,150,518.728,160,550,170,582.969,180,616.429,190,649.174,200,680,210,706.228%
,220,728.714,230,746.844,240,760,250,760.982,260,756.286,270,746.875,280,733.714,290,717.768%
,300,700,310,682.125,320,664,330,646.375,340,630,350,620.486,360,613.333,370,608.125,380,604.444%
,390,601.875,400,600,410,600.469,420,600.444,430,599.156,440,595.833,450,589.705,460,580,470,558.500%
,480,535.429,490,512.143,500,490,510,474.107,520,460.571,530,449.250,540,440,550,433.795,560,429.286%
,570,426.063,580,423.714,590,421.830,600,420,610,415.938,620,412,630,408.313,640,405,650,403.973%
,660,403.429,670,403.063,680,402.571,690,401.652,700,400,710,394.609,720,389.167,730,384.141,740,380%
,750,381.696,760,384.857,770,388.875,780,393.143,790,397.054,800,400,810,399.031,820,397,830,393.969%
,840,390,850,384.549,860,378.333,870,371.563,880,364.444,890,357.188,900,350,910,347.344,920,344.444%
,930,340.781,940,335.833,950,329.080,960,320,970,304.281,980,287,990,268.719)
\put(600,390){\makebox(0,0)[t]{{\scriptsize $f$}}}
%
\thicklines\modra
\curve(100,430,120,498.4,140,557.6,160,607.6%
,180,648.4,200,680,220,702.4,240,715.6,260,719.6,280,714.4,300,700)
\curve(300,700,320,680.8,340,661.2,360,641.2%
,380,620.8,400,600,420,578.8,440,557.2,460,535.2,480,512.8,500,490)
\curve(720,389.167,740,395.56472,760,399.54688,780,401.11348%
,800,400.26452,820,397,840,391.31992,860,383.22428,880,372.71308,900,359.78632,920,344.444)
\put(100,430){\circle*{20}}\put(120,500){\makebox(0,0)[rb]{{\scriptsize $y_0$}}}
\put(200,680){\circle*{20}}\put(190,690){\makebox(0,0)[rb]{{\scriptsize $y_1$}}}
\put(300,700){\circle*{20}}\put(310,720){\makebox(0,0)[lb]{{\scriptsize $y_2$}}}
\put(400,600){\circle*{20}}\put(420,620){\makebox(0,0)[lb]{{\scriptsize $y_3$}}}
\put(500,490){\circle*{20}}\put(520,490){\makebox(0,0)[l]{{\scriptsize $y_4$}}}
\put(620,200){\makebox(0,0)[c]{{\bf\dots}}}
\put(720,389.167){\circle*{20}}\put(720,420){\makebox(0,0)[b]{{\scriptsize $y_{n\!-\!2}$}}}
\put(820,397){\circle*{20}}\put(800,420){\makebox(0,0)[lb]{{\scriptsize $y_{n\!-\!1}$}}}
\put(920,344.444){\circle*{20}}\put(940,360){\makebox(0,0)[lb]{{\scriptsize $y_n$}}}
%
\put(100,100){\line(1,0){400}}\put(100,100){\line(0,1){330}}\put(300,100){\line(0,1){600}}
\put(500,100){\line(0,1){390}}
\put(720,100){\line(1,0){200}}\put(720,100){\line(0,1){289.167}}\put(920,100){\line(0,1){244.444}}
\end{picture}
%
\
%
\setlength{\unitlength}{0.04mm}%
\begin{picture}(970,800)(0,100)
%%%%%%%%%%%%%%%%%%%%%%%%
\zlta\linethickness{1.8mm}%
\put(330,720){\bigcircle{180}}\put(330,720){\bigcircle{100}}\put(330,720){\bigcircle{20}}
\cierna\thinlines
\put(330,20){\line(0,1){880}}\put(60,450){\line(1,0){540}}
\put(325,900){\makebox(0,0)[rt]{{\scriptsize $y$}}}
\put(60,460){\makebox(0,0)[lb]{{\scriptsize $x$}}}
\put(320,440){\makebox(0,0)[rt]{{\scriptsize $0$}}}
\put(220,440){\line(0,1){20}}\put(440,440){\line(0,1){20}}
\put(440,430){\makebox(0,0)[t]{{\scriptsize $r$}}}
\dottedline{10}(220,180)(220,720)\dottedline{10}(440,180)(440,390)\dottedline{10}(440,450)(440,720)
\put(320,180){\line(1,0){20}}\put(320,720){\line(1,0){20}}\put(320,830){\line(1,0){20}}
\put(560,720){\line(1,0){20}}\put(560,830){\line(1,0){20}}
\put(570,585){\vector(0,1){135}}\put(570,585){\vector(0,-1){135}}
\put(580,585){\makebox(0,0)[l]{{\scriptsize $d$}}}
\put(570,775){\vector(0,1){55}}\put(570,775){\vector(0,-1){55}}
\put(580,775){\makebox(0,0)[l]{{\scriptsize $r$}}}
%
\modra\thinlines\linethickness{.25pt}
\put(330,610){\curve(0,0,110,110)\curve(-59,16,94,169)\curve(-94,51,59,204)\curve(-110,110,0,220)}
%
\modra\thicklines
\put(330,720){\bigcircle{220}}
\put(330,180){\arc[3](0,110){-120}}\put(330,180){\arc(0,-110){60}}
```

```
\put(330,180){\arc[3](0,110){120}}\put(330,180){\arc(0,-110){-60}}
\put(400,840){\makebox(0,0)[l]{{\scriptsize $f_1$}}}
\put(380,600){\makebox(0,0)[l]{{\scriptsize $f_2$}}}
%
\put(220,720){\circle*{25}}\put(440,720){\circle*{25}}
\renewcommand{\xscale}{.35}\put(220,450){\arc(0,270){180}}\put(220,450){\arc[4](0,270){-180}}
\put(330,450){\arc(0,380){180}}\put(330,450){\arc[5](0,380){-180}}
\put(440,450){\bigcircle{540}}\put(330,450){\bigcircle[3]{320}}\renewcommand{\xscale}{1}
\curve(420,115,490,220)\curve(240,115,170,220)
\curve(420,785,490,680)\curve(240,785,170,680)
%
\cierna
\renewcommand{\xscale}{.35}\put(70,450){\arc(-100,0){-135}}\put(70,450){\arc(-100,0){135}}
\renewcommand{\xscale}{1}
\put(70,450){\curve(24.75,-70.71,5.8637,-87.09)\curve(24.75,-70.71,22.9778,-95.6471)%
              \curve(24.75,70.71,22.9778,95.6471)\curve(24.75,70.71,5.8637,87.09)}
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
\put(680,500){\zlta\linethickness{2.5mm}%
\put(100,185){\bigcircle{55}}\linethickness{4.7mm}\put(100,50){\line(0,1){135}}
\cierna\thinlines
\put(0,50){\line(1,0){200}}\put(100,25){\line(0,1){275}}

\put(45,40){\line(0,1){20}}\put(155,40){\line(0,1){20}}
\put(45,40){\makebox(0,0)[rt]{{\scriptsize $-r$}}}
\put(155,40){\makebox(0,0)[lt]{{\scriptsize $\vphantom{-}r$}}}
\modra\thicklines
\put(45,50){\line(0,1){135}}\put(155,50){\line(0,1){135}}\put(45,50){\line(1,0){110}}
\put(100,185){\arc(55,0){180}\arc[2](55,0){-180}}
\put(110,250){\makebox(0,0)[lb]{{\scriptsize $f_1$}}}
\thinlines\linethickness{.25pt}
\put(100,50){\curve(20,0,55,35)\curve(-40,0,55,95)\curve(-55,45,52,152)\curve(-55,105,24,184)}
\cierna\put(100,90){\circle*{15}}\put(90,185){\line(1,0){20}}
\renewcommand{\xscale}{.35}\put(83,50){\arc(-60,0){-135}}\put(83,50){\arc(-60,0){135}}
\renewcommand{\xscale}{1}
\put(100,10){\curve(0,0,-15,-8)\curve(0,0,0,-17)}
\put(230,120){\bigcircle{70}\makebox(0,0)[c]{$+$}}
}
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
\put(680,150){\zlta\linethickness{.45mm}%
\multiput(100,180)(0,-10){3}{\arc(0,-55){75}\arc(0,-55){-75}}
\linethickness{4.7mm}\put(100,50){\line(0,1){80}}
\cierna\thinlines
\put(0,50){\line(1,0){200}}\put(100,25){\line(0,1){225}}
\put(45,40){\line(0,1){20}}\put(155,40){\line(0,1){20}}
\put(45,40){\makebox(0,0)[rt]{{\scriptsize $-r$}}}
\put(155,40){\makebox(0,0)[lt]{{\scriptsize $\vphantom{-}r$}}}
\modra\thicklines
\put(45,50){\line(0,1){135}}\put(155,50){\line(0,1){135}}\put(45,50){\line(1,0){110}}
\put(100,185){\arc(55,0){-180}\arc[2](55,0){10}\arc[2](-55,0){-100}}
\put(110,200){\makebox(0,0)[lb]{{\scriptsize $f_2$}}}
\modra\thinlines\linethickness{.25pt}
\put(100,50){\curve(20,0,55,35)\curve(-40,0,55,95)\curve(-55,45,-18,82)\curve(-55,105,-50,110)}
\cierna\put(100,90){\circle*{15}}\put(90,185){\line(1,0){20}}
\renewcommand{\xscale}{.35}\put(83,50){\arc(-60,0){-135}}\put(83,50){\arc(-60,0){135}}
\renewcommand{\xscale}{1}
\put(100,10){\curve(0,0,-15,-8)\curve(0,0,0,-17)}
\put(230,120){\bigcircle{70}\makebox(0,0)[c]{$-$}}}
%
\end{picture}
%
\
%
\setlength{\unitlength}{0.04mm}%
\begin{picture}(1200,800)
\zlta\linethickness{.9mm}%
\put(600,635){\curve(10,-10,225,-225)}\put(600,605){\curve(10,-10,195,-195)}
\put(1100,165){\curve(-10,10,-225,225)}\put(1100,195){\curve(-10,10,-195,195)}
\linethickness{.45mm}\put(600,405){\line(1,0){250}}\put(605,400){\line(0,1){250}}
\put(1100,395){\line(-1,0){250}}\put(1095,400){\line(0,-1){250}}
\linethickness{1.8mm}
\put(600,430){\line(1,0){190}}\put(600,470){\line(1,0){150}}
\put(600,510){\line(1,0){110}}\put(600,550){\line(1,0){70}}\put(600,590){\line(1,0){30}}
\put(1100,370){\line(-1,0){190}}\put(1100,330){\line(-1,0){150}}
\put(1100,290){\line(-1,0){110}}\put(1100,250){\line(-1,0){70}}\put(1100,210){\line(-1,0){30}}
%
\cierna\thinlines
\put(0,400){\line(1,0){1200}}\put(600,50){\line(0,1){750}}
\put(580,800){\makebox(0,0)[rt]{{\scriptsize $y$}}}
\put(1200,380){\makebox(0,0)[rt]{{\scriptsize $x$}}}
\put(585,390){\makebox(0,0)[rt]{{\scriptsize $0$}}}
\dottedline{10}(100,150)(600,150)\dottedline{10}(715,150)(1100,150)
%
```

```
\modra\thinlines\linethickness{.25pt}\put(600,600){\curve(0,0,25,25)}
\put(600,500){\curve(0,0,75,75)}\put(600,400){\curve(0,0,125,125)}\put(700,400){\curve(0,0,75,75)}
\put(800,400){\curve(0,0,25,25)}\put(900,400){\curve(0,0,-25,-25)}\put(1000,400){\curve(0,0,-75,-75)}
\put(1100,400){\curve(0,0,-125,-125)}\put(1100,300){\curve(0,0,-75,-75)}
\put(1100,200){\curve(0,0,-25,-25)}
%
\cierna\thicklines
\multiput(100,390)(125,0){9}{\line(0,1){20}}\multiput(590,150)(0,125){5}{\line(1,0){20}}
\put(100,420){\makebox(0,0)[rb]{{\scriptsize $-4$}}}
\put(350,420){\makebox(0,0)[rb]{{\scriptsize $-2$}}}
\put(850,420){\makebox(0,0)[lb]{{\scriptsize $2$}}}
\put(1100,420){\makebox(0,0)[lb]{{\scriptsize $4$}}}
\put(620,150){\makebox(0,0)[l]{{\scriptsize $-2$}}}
\put(620,660){\makebox(0,0)[l]{{\scriptsize $2$}}}
%
\modra\thicklines
\curve(600,650,600,400)\curve(600,650,1100,150)\curve(1100,400,1100,150)
\curve(600,650,100,150)\curve(100,400,100,150)\curve(100,400,1100,400)
\put(600,650){\circle*{25}}\put(1100,150){\circle*{25}}
\renewcommand{\yscale}{.3}\put(600,400){\arc(500,0){-180}\arc[12](500,0){180}}
\put(600,400){\arc(500,0){78}\arc(-500,0){-78}}
\put(600,400){\arc(250,0){-180}\arc[6](250,0){180}}
\put(600,150){\arc[12](500,0){180}\arc(500,0){-35}\arc(-500,0){35}}
\curvedashes[.25mm]{2,2,1}\put(600,150){\arc(500,0){-45}\arc(-500,0){45}}\curvedashes{}%
%
\cierna\thicklines
\renewcommand{\yscale}{.3}\put(600,720){\arc(0,-100){-135}\arc(0,-100){135}}
\renewcommand{\yscale}{1}
\put(600,718){\curve(-70.71,24.75,-87.09,5.8637)\curve(-70.71,24.75,-95.6471,22.9778)%
  \curve(70.71,24.75,95.6471,22.9778)\curve(70.71,24.75,87.09,5.8637)}
\put(600,-30){\makebox(0,0)[c]{{\scriptsize $f(x)\!=\!2\!-\!x$, $x\in\langle0,4\rangle$}}}
\end{picture}
\caption{Numerické integrovanie Simpsonovou metódou,
  objem anuloidu a objem rotačného telesa vzniknutého rotáciou trojuholníkov okolo osi $y$}
\label{picture16}
\end{center}
\end{figure}
```

Využitie makra \prHobr

```
%.....................................................................
\begin{figure}[ht]
\begin{center}
\prHobr{r}32021\hfill \prHobr{k}32021\hfill \prHobr{k}31131\hfill \prHobr{k}4123{-1}

\vspace{1.5em}

\prHobr{r}22{-2}31\hfill \prHobr{k}33{-3}21\hfill \prHobr{k}14{-1}11\hfill
\prHobr{r}15{-2}11\hfill \prHobr{r}16211

\vspace{2em}

\prHobr{r}{3.2}{2*2}121\hfill \prHobr{k}{16}1121\hfill \prHobr{r}{36}1121\hfill
\prHobr{k}1{16}121\hfill \prHobr{r}1{36}121
\caption{Využitie makra  \texttt{\textbackslash prHobr}}
\label{picture100}
\end{center}
\end{figure}
```