1 定义随机点

可以使用以下四种方式定义随机点

1. 矩形内的点;
2. 线段上的点;
3. 直线上的点;
4. 圆上的点.

1.1 \tkzDefRandPointOn命令：定义随机点

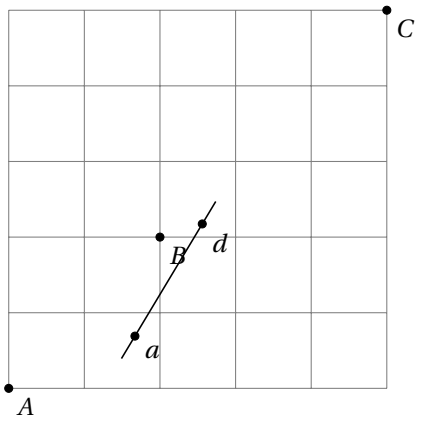
该命令取代了旧的**\tkzGetRandPointOn**命令，用于定义随机点。

\tkzDefRandPointOn[⟨ 命令选项⟩**]**

可以用**\tkzGetPoint**保存并命名定义的随机点，如仅为临时使用，则可使用 **\tkzPointResult**命令。

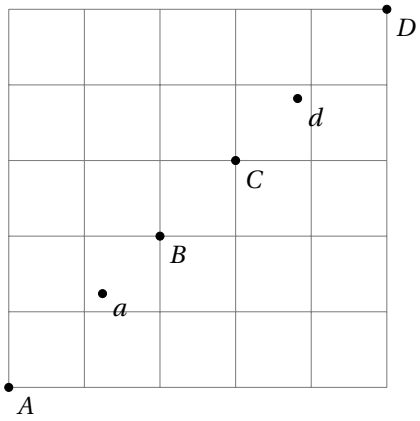
选项	默认值	含义
rectangle=pt1 and pt2		[rectangle=A and B]
segment= pt1--pt2		[segment=A--B]
line=pt1--pt2		[line=A--B]
circle =center pt1 radius dim		[circle = center A radius 2 cm]
circle through=center pt1 through pt2		[circle through= center A through B]
disk through=center pt1 through pt2		[disk through=center A through B]

1.2 矩形内的随机点



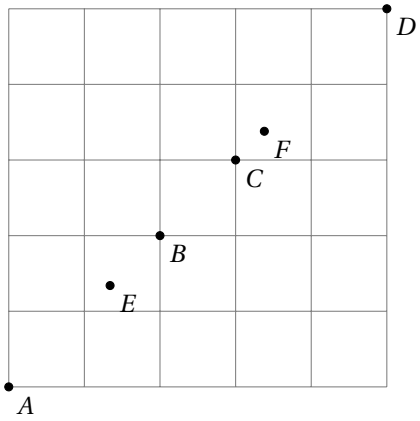

```
\begin{tikzpicture}
  \tkzInit[xmax=5,ymax=5]
  \tkzGrid
  \tkzDefPoints{0/0/A,2/2/B,5/5/C}
  \tkzDefRandPointOn[rectangle = A and B]
  \tkzGetPoint{a}
  \tkzDefRandPointOn[rectangle = B and C]
  \tkzGetPoint{d}
  \tkzDrawLine(a,d)
  \tkzDrawPoints(A,B,C,a,d)
  \tkzLabelPoints(A,B,C,a,d)
\end{tikzpicture}
```

1.3 线段上的随机点



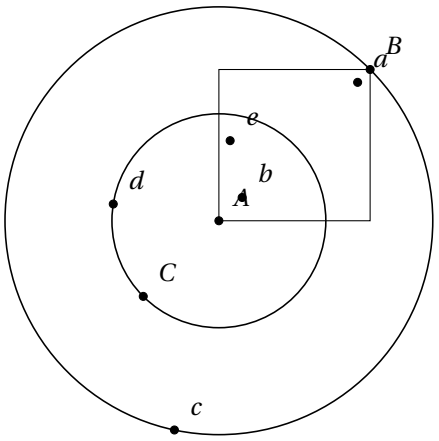

```
\begin{tikzpicture}
  \tkzInit[xmax=5,ymax=5]
  \tkzGrid
  \tkzDefPoints{0/0/A,2/2/B,3/3/C,5/5/D}
  \tkzDefRandPointOn[segment = A--B]\tkzGetPoint{a}
  \tkzDefRandPointOn[segment = C--D]\tkzGetPoint{d}
  \tkzDrawPoints(A,B,C,D,a,d)
  \tkzLabelPoints(A,B,C,D,a,d)
\end{tikzpicture}
```

1.4 直线上的随机点



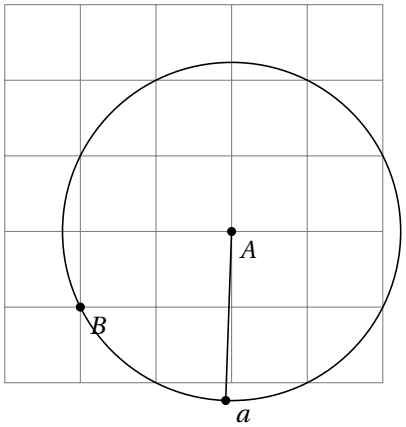

```
\begin{tikzpicture}
  \tkzInit[xmax=5,ymax=5]
  \tkzGrid
  \tkzDefPoints{0/0/A,2/2/B,3/3/C,5/5/D}
  \tkzDefRandPointOn[line = A--B]\tkzGetPoint{E}
  \tkzDefRandPointOn[line = C--D]\tkzGetPoint{F}
  \tkzDrawPoints(A,...,F)
  \tkzLabelPoints(A,...,F)
\end{tikzpicture}
```

1.4.1 随机点综合示例



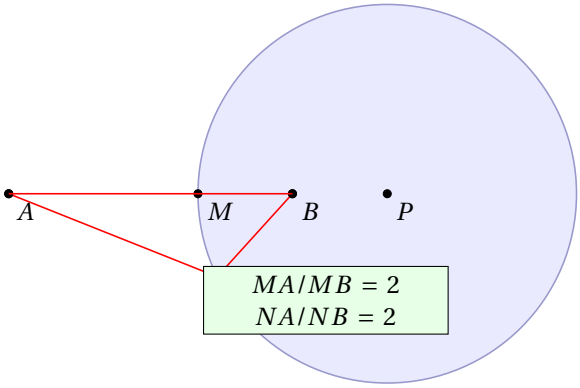

```
\begin{tikzpicture}
  \tkzDefPoints{0/0/A,2/2/B,-1/-1/C}
  \tkzDefCircle[through=](A,C)
  \tkzGetLength{rAC}
  \tkzDrawCircle(A,C)
  \tkzDrawCircle(A,B)
  \tkzDefRandPointOn[rectangle=A and B]
  \tkzGetPoint{a}
  \tkzDefRandPointOn[segment=A--B]
  \tkzGetPoint{b}
  \tkzDefRandPointOn[circle=center A radius \rAC pt]
    \tkzGetPoint{d}
  \tkzDefRandPointOn[circle through= center A through B]
    \tkzGetPoint{c}
  \tkzDefRandPointOn[disk through=center A through B]
    \tkzGetPoint{e}
  \tkzLabelPoints[above right=3pt](A,B,C,a,b,...,e)
  \tkzDrawPoints[](A,B,C,a,b,...,e)
  \tkzDrawRectangle(A,B)
\end{tikzpicture}
```

1.5 圆上的随机点




```
\begin{tikzpicture}
  \tkzInit[xmax=5,ymax=5]
  \tkzGrid
  \tkzDefPoints{3/2/A,1/1/B}
  \tkzCalcLength[cm](A,B) \tkzGetLength{rAB}
  \tkzDrawCircle[R](A,\rAB cm)
  \tkzDefRandPointOn[circle = center A radius
    \rAB cm]\tkzGetPoint{a}
  \tkzDrawSegment(A,a)
  \tkzDrawPoints(A,B,a)
  \tkzLabelPoints(A,B,a)
\end{tikzpicture}
```

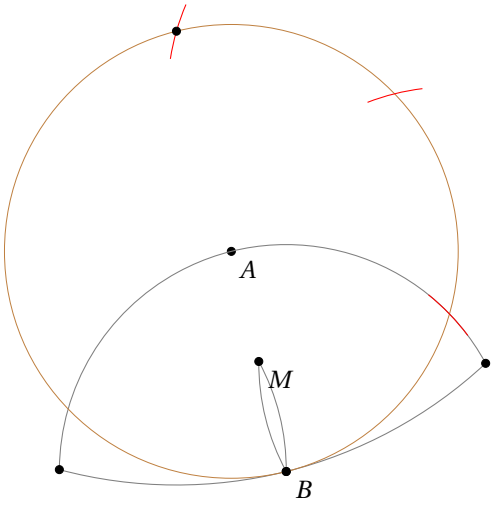
1.5.1 Apollonius 圆的随机示例




```
\begin{tikzpicture}[scale=1.25]
  \tkzDefPoints{0/0/A,3/0/B}
  \def\coeffK{2}
  \tkzApolloniusCenter[K=\coeffK](A,B)
  \tkzGetPoint{P}
  \tkzDefApolloniusPoint[K=\coeffK](A,B)
  \tkzGetPoint{M}
  \tkzDefApolloniusRadius[K=\coeffK](A,B)
  \tkzDrawCircle[R,color = blue!50!black, fill=blue!20,
     opacity=.4](tkzPointResult,\tkzLengthResult pt)
  \tkzDefRandPointOn[circle through= center P through M]
  \tkzGetPoint{N}
  \tkzDrawPoints(A,B,P,M,N)
  \tkzLabelPoints(A,B,P,M,N)
  \tkzDrawSegments[red](N,A N,B)
  \tkzDrawPoints(A,B)
  \tkzDrawSegments[red](A,B)
  \tkzLabelCircle[R,draw,fill=green!10, text width=3cm,
     text centered](P,\tkzLengthResult pt-20pt)(-120)
    {$MA/MB=\coeffK$\\$NA/NB=\coeffK$}
\end{tikzpicture}
```

1.5.2 线段中点

可以用尺规作图的方式求得线段的中点。




```
\begin{tikzpicture}[scale=.75]
  \tkzDefPoint(0,0){A}
  \tkzDefRandPointOn[circle= center A radius 4cm]
  \tkzGetPoint{B}
  \tkzDrawPoints(A,B)
  \tkzDefPointBy[rotation= center A angle 180](B)
  \tkzGetPoint{C}
  \tkzInterCC[R](A,4 cm)(B,4 cm)
  \tkzGetPoints{I}{I'}
  \tkzInterCC[R](A,4 cm)(I,4 cm)
  \tkzGetPoints{J}{B}
  \tkzInterCC(B,A)(C,B)
  \tkzGetPoints{D}{E}
  \tkzInterCC(D,B)(E,B)
  \tkzGetPoints{M}{M'}
  \tikzset{arc/.style={color=brown,style=dashed,delta=10}}
  \tkzDrawArc[arc](C,D)(E)
  \tkzDrawArc[arc](B,E)(D)
  \tkzDrawCircle[color=brown,line width=.2pt](A,B)
  \tkzDrawArc[arc](D,B)(M)
  \tkzDrawArc[arc](E,M)(B)
  \tkzCompasss[color=red,style=solid](B,I I,J J,C)
  \tkzDrawPoints(B,C,D,E,M)
  \tkzLabelPoints(A,B,M)
\end{tikzpicture}
```