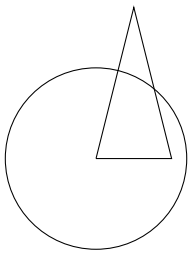
Ejemplos muy sencillos de Tikz

Héctor Manuel Mora Escobar
hectormora@yahoo.com

Algunas fuentes en internet:
Tisseau y Duma, TikZ pour l'impatient.
Cremer, A very minimal introduction to TikZ.
Tintau, TikZ & PGF (la "biblia").

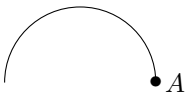
0.1 Primer ejemplo

```
\documentclass{report}
\usepackage{tikz}
\begin{document}

\begin{center}
  \begin{tikzpicture}
    %\begin{tikzpicture}[scale=2]
    %\begin{tikzpicture}[xscale=2, yscale=3]
    \draw (0,0) -- (1,0) -- (0.5,2) -- (0,0);
    \draw (0,0) circle(1.2);
  \end{tikzpicture}
\end{center}

\end{document}
```



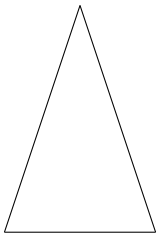
0.2 Arcos

```
\begin{center}
  \begin{tikzpicture}
    %
    % punto inicial, grado inicial, final, radio
    \draw (2,0) arc (0:180:1);
    %
    \draw (2,0) node[right]  {$A$};
    %\draw (2,0) node  {$A$};
    % above, below, right, left,
    % above left, above right, below left, below right
    \draw (2,0) node {$\bullet$};
    %
  \end{tikzpicture}
\end{center}
```



0.3 Definiendo puntos

```
\begin{center}
  \begin{tikzpicture}
    \coordinate (A) at (0,0) ;
    \coordinate (B) at (2,0) ;
    \coordinate (C) at (1,3) ;
    \draw (A) -- (B) ;
    \draw (B) -- (C) ;
    \draw (A) -- (C) ;
  \end{tikzpicture}
\end{center}
```

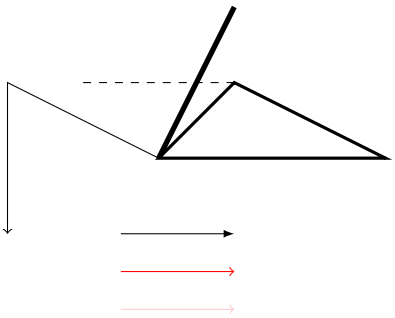


0.4 Rectángulo

```
\begin{center}
  \begin{tikzpicture}
    \draw (1,0) rectangle (4,2);
  \end{tikzpicture}
\end{center}
```

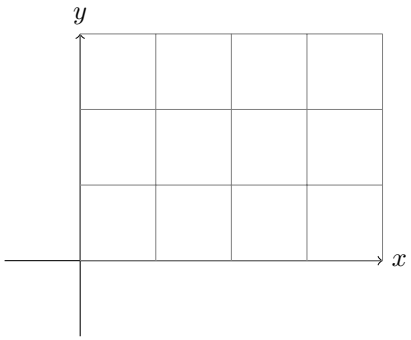
0.5 Tipos de líneas

```
\begin{center}
  \begin{tikzpicture}
    % thin, very thin, ultra thin thick, very thick, ultra thick
    \draw [very thick] (0,0) -- (3,0) -- (1,1) -- cycle;
    \draw [line width = 2pt] (0,0) -- (1,2);
    %
    % linea de trazos
    \draw [dashed] (-1,1) -- (1,1);
    % loosely dashed, densely dashed
    %dotted, loosely dotted, densely dotted
    \draw[->] (0,0) -- (-2,1) -- (-2,-1);
    \draw[->, >=latex] (-0.5,-1) -- (1,-1); % punta de flecha mas ‘‘solida’’
    \draw[->, color = red] (-0.5,-1.5) -- (1, -1.5);
    %red, green, blue, cyan, yellow, magenta, black, white, gray
    \draw[->, color = red!20] (-0.5,-2) -- (1, -2);
  \end{tikzpicture}
\end{center}
```



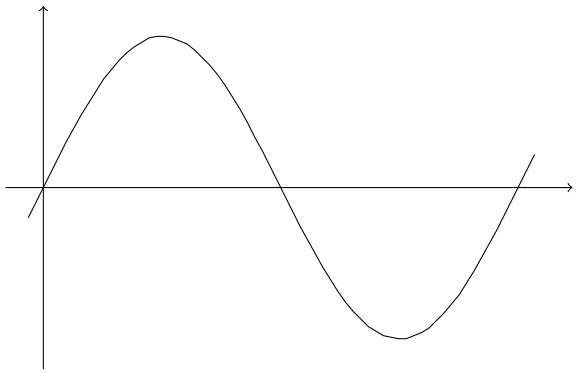
0.6 Ejes, rejilla

```
\begin{center}
  \begin{tikzpicture}
    \draw[->] (-1,0) -- (4,0);
    \draw (4,0) node[right] {$x$};
    \draw [->] (0,-1) -- (0,3);
    \draw (0,3) node[above] {$y$};
    \draw [very thin, gray] (0,0) grid (4,3);
  \end{tikzpicture}
\end{center}
```

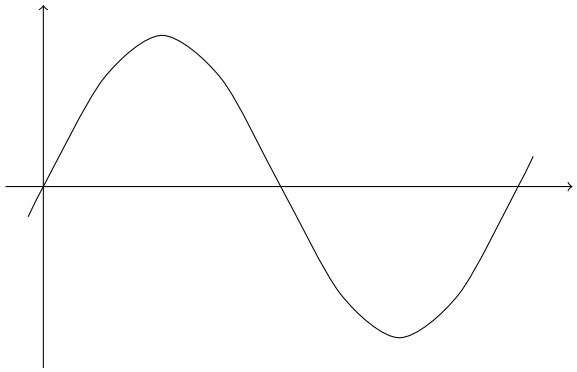


0.7 Curvas

```
  \begin{tikzpicture}[yscale=2]
    \draw[->] (-0.5,0) -- (7,0);
    \draw [->] (0,-1.2) -- (0,1.2);
\draw
% MUCHOS PUNTOS
(-0.20,-0.20)--(-0.10,-0.10)--(0.00,0.00)--(0.10,0.10)--(0.20,0.20)--
(0.30,0.30)--(0.40,0.39)--(0.50,0.48)--(0.60,0.56)--(0.70,0.64)--
(0.80,0.72)--(0.90,0.78)--(1.00,0.84)--(1.10,0.89)--(1.20,0.93)--
(1.30,0.96)--(1.40,0.99)--(1.50,1.00)--(1.60,1.00)--(1.70,0.99)--
(1.80,0.97)--(1.90,0.95)--(2.00,0.91)--(2.10,0.86)--(2.20,0.81)--
(2.30,0.75)--(2.40,0.68)--(2.50,0.60)--(2.60,0.52)--(2.70,0.43)--
(2.80,0.33)--(2.90,0.24)--(3.00,0.14)--(3.10,0.04)--(3.20,-0.06)--
(3.30,-0.16)--(3.40,-0.26)--(3.50,-0.35)--(3.60,-0.44)--(3.70,-0.53)--
(3.80,-0.61)--(3.90,-0.69)--(4.00,-0.76)--(4.10,-0.82)--(4.20,-0.87)--
(4.30,-0.92)--(4.40,-0.95)--(4.50,-0.98)--(4.60,-0.99)--(4.70,-1.00)--
(4.80,-1.00)--(4.90,-0.98)--(5.00,-0.96)--(5.10,-0.93)--(5.20,-0.88)--
(5.30,-0.83)--(5.40,-0.77)--(5.50,-0.71)--(5.60,-0.63)--(5.70,-0.55)--
(5.80,-0.46)--(5.90,-0.37)--(6.00,-0.28)--(6.10,-0.18)--(6.20,-0.08)--
(6.30,0.02)--(6.40,0.12)--(6.50,0.22);
  \end{tikzpicture}
\end{center}
```



```
\begin{center}
  \begin{tikzpicture}[yscale=2]
    \draw[->] (-0.5,0) -- (7,0);
    \draw [->] (0,-1.2) -- (0,1.2);
    % POCOS PUNTOS, SUAVIZACION APROXIMADA
    \draw plot[smooth]  coordinates
{(-0.20,-0.20)(0.00,0.00)(0.79,0.71)(1.57,1.00)(2.36,0.71)
(3.14,0.00)(3.93,-0.71)(4.71,-1.00)(5.50,-0.71)(6.28,-0.00)
(6.48,0.20)};
  \end{tikzpicture}
\end{center}
```

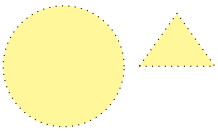


0.8 Rellenar

```
\begin{center}
  \begin{tikzpicture}
    \draw [fill=yellow] (1,0) -- (2,0) -- (1.5,0.7) -- cycle;
  \end{tikzpicture}
\end{center}
```

0.9 Estilos

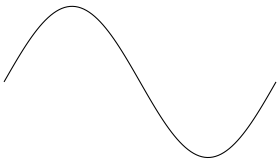
```
\tikzstyle{miEstilo}= [thin, dotted, fill=yellow!50]
\begin{center}
  \begin{tikzpicture}
    \draw [miEstilo] (0,0) circle (0.8);
    \draw [miEstilo] (1,0) -- (2,0) -- (1.5,0.7) -- cycle;
  \end{tikzpicture}
\end{center}
```



0.10 Funciones

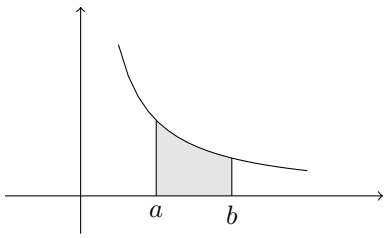
```
\begin{center}
  \begin{tikzpicture}[scale = 0.5]
    %
    \draw [domain=-3:3] plot(\x, { sin(2*\x r) } );
    \draw [domain=-2:2,samples = 100] plot(\x, { cos(2*\x r) } );
    % por defecto el dominio es -5:5
    %                samples = 25
    % abs, exp, ln, sqrt,  round,  floor ceil
    % sin, cos , tan , cot , sec , cosec, asin , acos , atan
  \end{tikzpicture}
\end{center}
```

```
\begin{center}
  \begin{tikzpicture}[xscale=0.01]
  \draw [domain=0:360,samples=100] plot(\x, { sin(\x ) } );
  \end{tikzpicture}
\end{center}
```



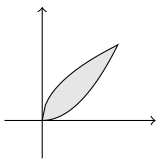
0.11 Región bajo una curva

```
\begin{center}
  \begin{tikzpicture}
%
    \fill[color=gray!20]
    (1,0) -- (1,1)
    -- plot [domain=1:2] (\x,1/\x)
    -- (2,0) -- cycle;
%
    \draw [domain=0.5:3,samples=20] plot(\x, 1/\x );
    \draw (1,0) -- (1,1);
    \draw (2,0) -- (2,0.5);
%
    \draw[->] (-1,0) -- (4,0);
    \draw [->] (0,-0.5) -- (0,2.5);
%
    \draw (1,0) node[below] {$a$};
    \draw (2,0) node[below] {$b$};
%
% el orden en que se dibujan puede influir en el resultado,
% por ejemplo, dibuje primero los ejes
%
  \end{tikzpicture}
\end{center}
```



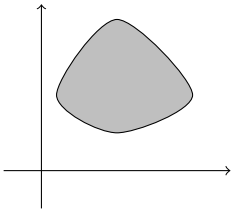
0.12 Región entre dos curvas, `filldraw`

```
\begin{center}
  \begin{tikzpicture}
%
    \filldraw[draw=black,fill=gray!20]
    plot [domain=0:1] (\x,{sqrt(\x)})
    -- plot [smooth,domain=1:0] (\x,\x^2)
    -- cycle;
%
    \draw[->] (-0.5,0) -- (1.5,0);
    \draw [->] (0,-0.5) -- (0,1.5);
%
  \end{tikzpicture}
\end{center}
```



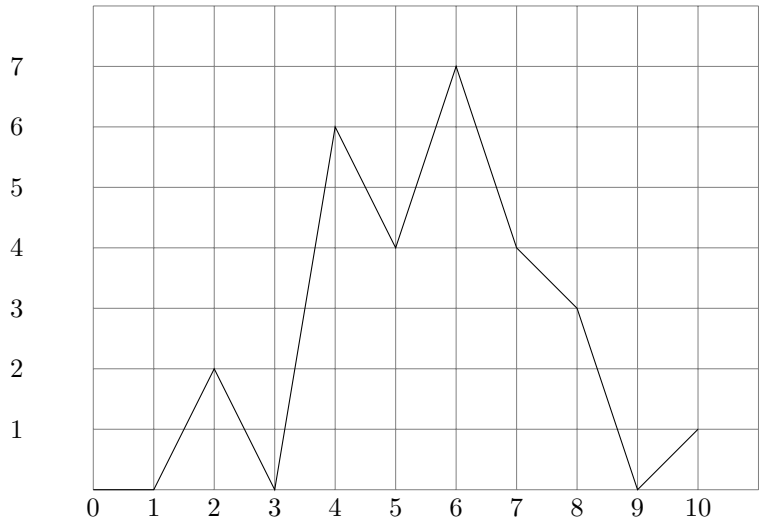
0.13 Región dentro de una curva cerrada definida por coordenadas

```
\begin{center}
  \begin{tikzpicture}
%
    \filldraw[draw=black,fill=gray!50]
      plot[smooth cycle] coordinates{
      (0.2,1)(1,2)(2,1)(1,0.5)};
%
    \draw[->] (-0.5,0) -- (2.5,0);
    \draw [->] (0,-0.5) -- (0,2.2);
%
  \end{tikzpicture}
\end{center}
```

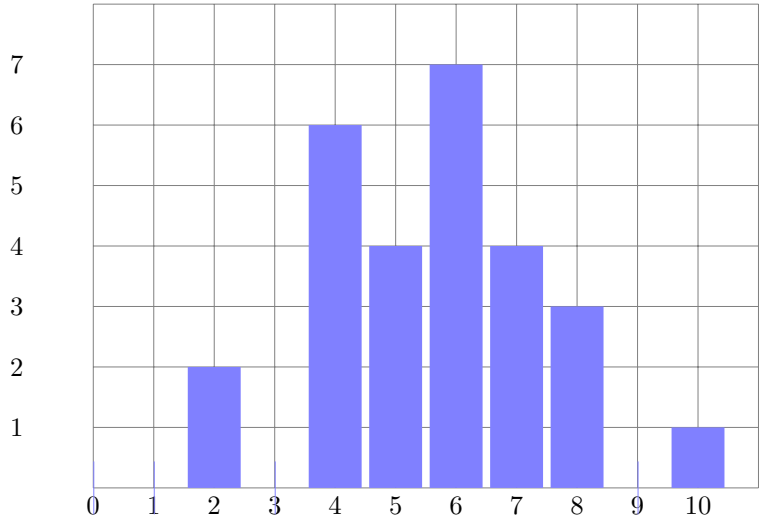


0.14 Datos estadísticos

```
\newcommand{\misDatos}
{(0,0)(1,0)(2,2)(3,0)(4,6)(5,4)(6,7)(7,4)(8,3)(9,0)(10,1)}

\begin{center}
  \begin{tikzpicture}[scale=0.8]
    \draw [very thin, gray] (0,0) grid (11,8);
    \foreach \y in {1,2,...,7} \draw(-1,\y)node[left]{\y};
    \foreach \x in {0,1,...,10} \draw(\x,0)node[below]{\x};
    %
    \draw plot coordinates {\misDatos};
  \end{tikzpicture}
\end{center}
```



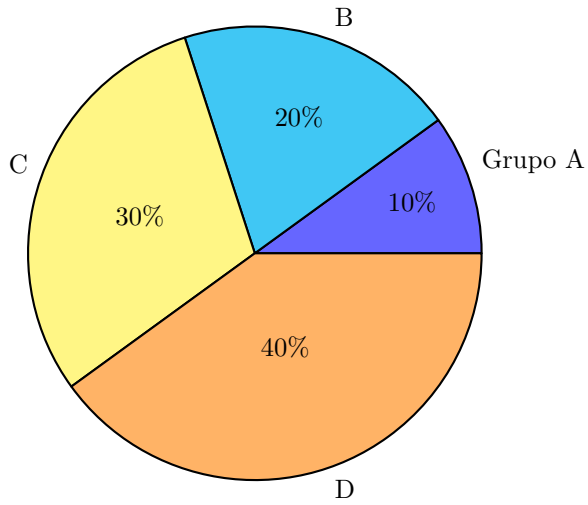
```
\begin{center}
  \begin{tikzpicture}[scale=0.8]
    \draw [very thin, gray] (0,0) grid (11,8);
    \foreach \y in {1,2,...,7} \draw(-1,\y)node[left]{\y};
    \foreach \x in {0,1,...,10} \draw(\x,0)node[below]{\x};
    %
    \draw[line width=7mm,color=blue!50] plot[ycomb] coordinates {\misDatos};
  \end{tikzpicture}
\end{center}
```



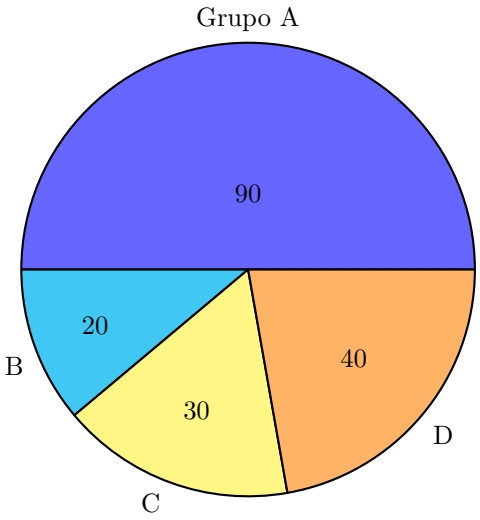
0.14.1 Gráficos de torta

Hay que usar el paqute, `pgf=pie`, es decir `\usepackage{pgf-pie}`. Algunos dicen que puede causar conflicto.

```
\begin{center}
  \begin{tikzpicture}
    \pie{10/{Grupo A}, 20/B, 30/C, 40/D}
  \end{tikzpicture}
\end{center}
```



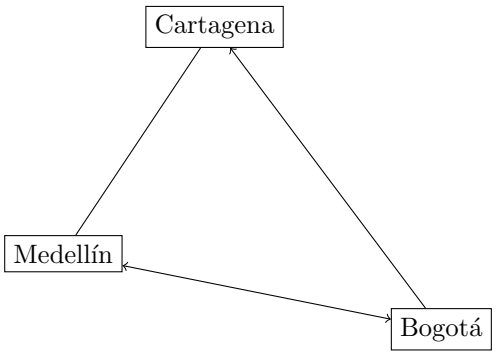
```
\begin{center}
  \begin{tikzpicture}
    \pie[sum = auto]{90/{Grupo A}, 20/B, 30/C, 40/D}
  \end{tikzpicture}
\end{center}
```



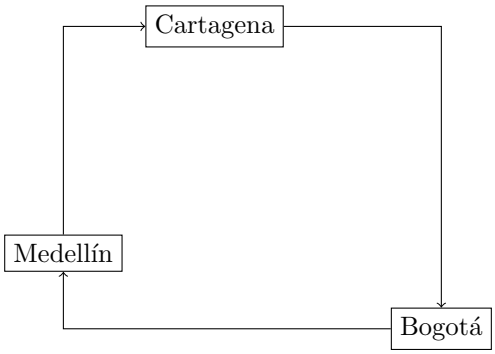
0.15 Grafos

Ojo: hay que agregar `\usetikzlibrary{shapes,snakes}` depués de `\usepackage{tikz}`

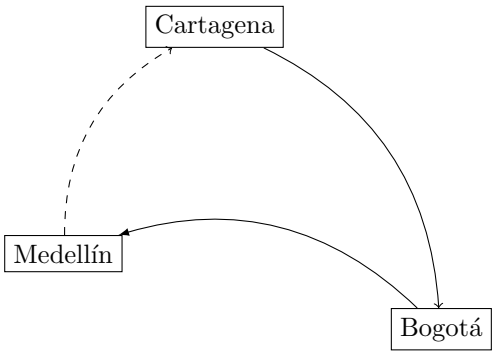
```
\begin{center}
  \begin{tikzpicture}
    \node[draw] (B) at (5,0) {Bogotá};
    %\node[draw,rectangle,rounded corners=3pt] (B) at (5,0) {Bogota};
    %\node[draw, diamond] (B) at (5,0) {Bogotá};
    %            ellipse circle
    \node[draw] (M) at (0,1) {Medellín};
    \node[draw] (C) at (2,4) {Cartagena};
    %
    \draw[<->] (B) -- (M);
    \draw[->] (B) -- (C);
    \draw (C) -- (M);
  \end{tikzpicture}
\end{center}
```



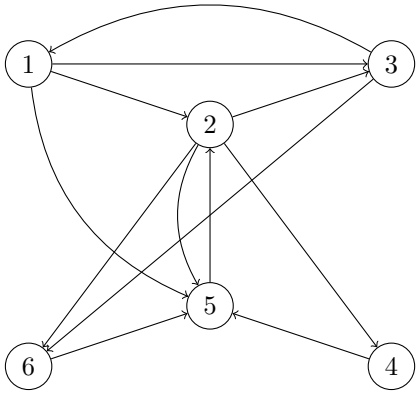
```
\begin{center}
  \begin{tikzpicture}
    \node[draw] (B) at (5,0) {Bogotá};
    \node[draw] (M) at (0,1) {Medellín};
    \node[draw] (C) at (2,4) {Cartagena};
    %
    \draw[->] (B) -| (M);
    % primero un segmento horizontal, despues uno vertical
    %
    \draw[->] (M) |- (C); % primero vertical, despues horizontal
    \draw[->] (C) -| (B);
  \end{tikzpicture}
\end{center}
```




```
\begin{center}
  \begin{tikzpicture}
    \node[draw] (B) at (5,0) {Bogotá};
    \node[draw] (M) at (0,1) {Medellín};
    \node[draw] (C) at (2,4) {Cartagena};
    %
    \draw[->,>=latex] (B) to[bend right] (M);
    \draw[->, dashed] (M) to[bend left]  (C);
    \draw[->] (C) to[bend left] (B);
  \end{tikzpicture}
\end{center}
```




```
\begin{center}
\begin{tikzpicture}[scale=0.8]
\node[draw,circle] (1) at (0,5) {1};
\node[draw,circle] (2) at (3,4) {2};
\node[draw,circle] (3) at (6,5) {3};
\node[draw,circle] (4) at (6,0) {4};
\node[draw,circle] (5) at (3,1) {5};
\node[draw,circle] (6) at (0,0) {6};
%
\draw[->] (1) -- (2);
\draw[->] (1) to (3);
\draw[->] (1) to[bend right] (5);
\draw[->] (2) -- (3);
\draw[->] (2) -- (4);
\draw[->] (2) to[bend right] (5);
\draw[->] (2) -- (6);
\draw[->] (3) to[bend right] (1);
\draw[->] (3) -- (6);
\draw[->] (4) -- (5);
\draw[->] (5) -- (2);
\draw[->] (6) -- (5);
\end{tikzpicture}
\end{center}
```


1
3
2
5
6
4

```
\begin{center}
  \begin{tikzpicture}
    \node[draw] (SEL) at (0,0) {Sistema de ecuaciones lineales};
    \node[draw, text width = 4cm] (SEL2) at (5,0) {Sistema de ecuaciones lineales};
    \node[draw, text width = 3cm, text centered] (SEL3) at (10,0) {Sistema de ecuaciones lineales};
    %                              text justified
    \node[draw] (LQS) at (5,-4) {Lo que sigue};
    \draw[->] (SEL) -- (LQS) node[midway] {Carreta 1};
    \draw[->] (SEL2) -- (LQS)node[near start] {Segunda carreta};
    %                              very near start   near end   very near end
    \draw[->] (SEL3) -- (LQS) node[midway] {Todavía más carreta};
  \end{tikzpicture}
\end{center}
```