6

OTHER REPRESENTATIONS IN THE PLANE
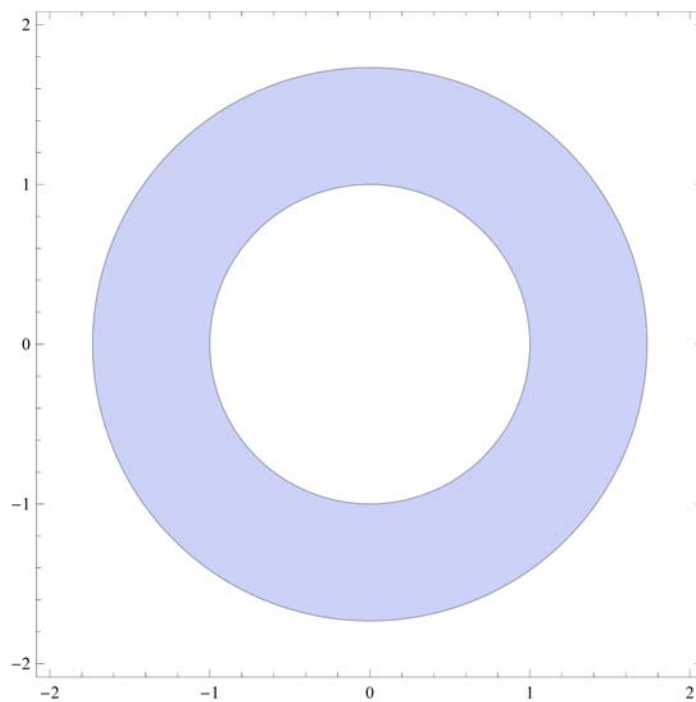

6.1. Domains or regions in the plane

▼ **RegionPlot**

★ **RegionPlot [Inequation , {x,xmin,xmax} , {y,ymin,ymax}]**
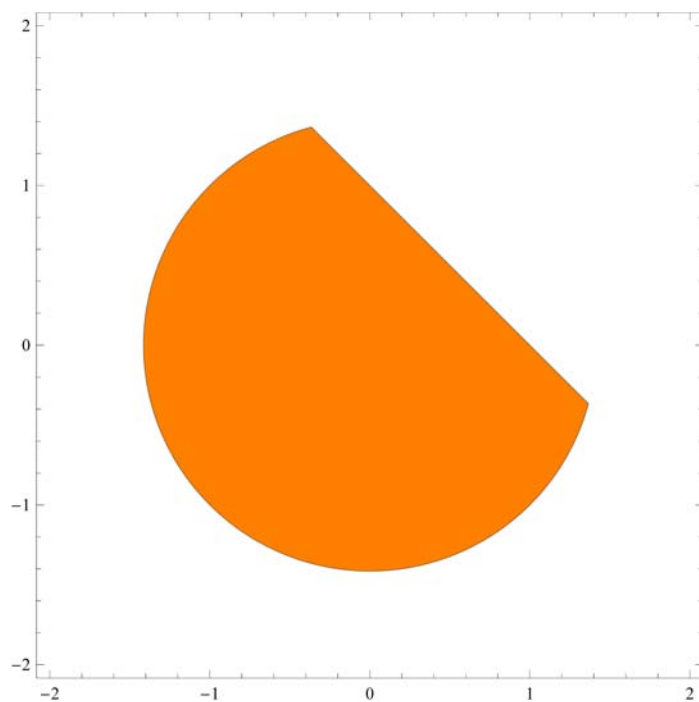
```
Clear["Global`*"]
RegionPlot[1 < x^2 + y^2 < 3, {x, -2, 2}, {y, -2, 2}]
```
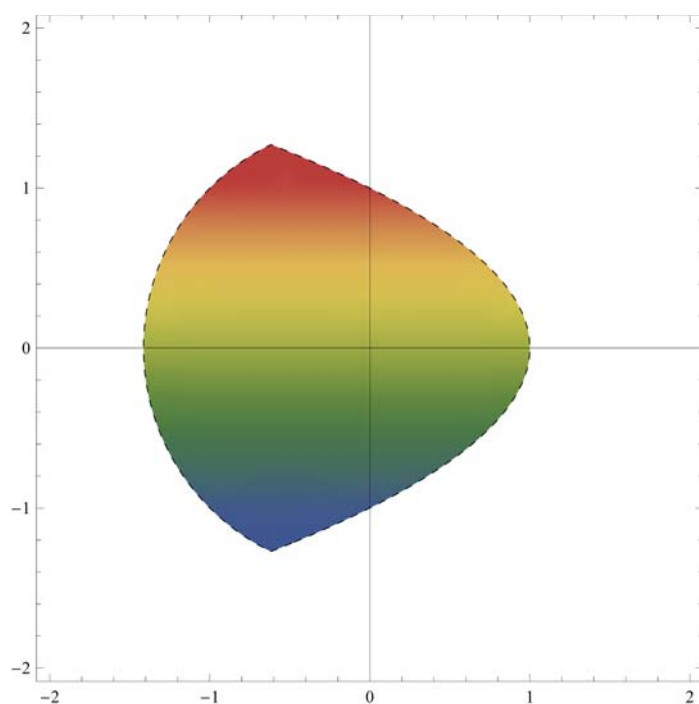
★ Region delimited by some inequalities

```
RegionPlot[x^2 + y^2 < 2 && x + y < 1, {x, -2, 2}, {y, -2, 2}, PlotStyle → Orange]
```


★ Options of the command RegionPlot

```
RegionPlot[x^2 + y^2 < 2 && x + y^2 < 1, {x, -2, 2}, {y, -2, 2},
 Axes → True, BoundaryStyle → Dashed, ColorFunction → "DarkRainbow"]
```


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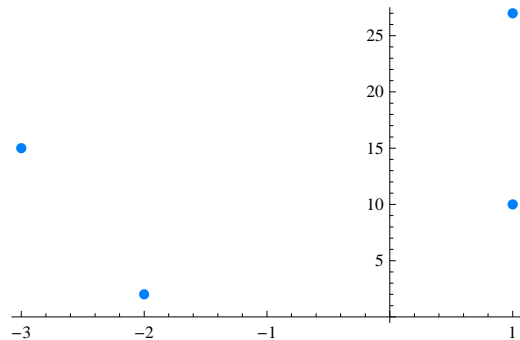Mª J. González Gómez

6.2. Polygonals and polygons

▼ Polygonals using ListPlot

Definition of the points

```
points = {{1, 27}, {-2, 2}, {-3, 15}, {1, 10}};
```

★ LisPlot[points, PlotStyle → colour, PlotStyle → PointSize [*n*]] It plots the points with the colour
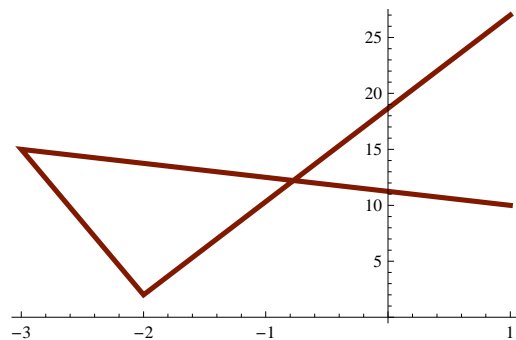   and style specified

```
g1 = ListPlot[points, PlotStyle → {PointSize[0.02], RGBColor[0, 0.5, 1]}]
```


★ Creation of the polygonal by joining the points
   Joined → True, PlotStyle → {Thickness[*n*],RGBColor[1, 0.5, 0]},

```
g2 = ListPlot[points, Joined → True, PlotStyle → {Thickness[0.01], RGBColor[0.5, 0.1, 0]}]
```
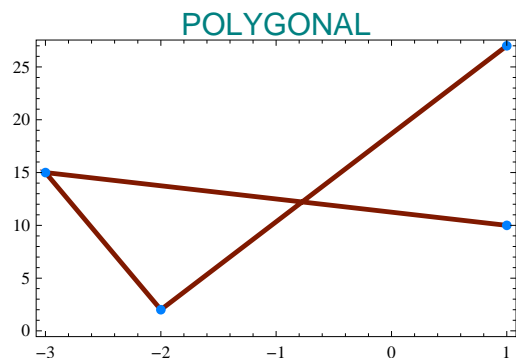

★ Insert the name of the axis: AxesLabel → *name*
   Plot the function in the specified range: PlotRange → {{xmin, xmax},{ymin, ymax}}
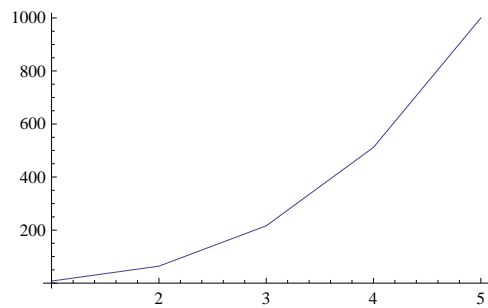
```
Show[g2, g1, PlotRange → {0, 27},
```
```
 PlotLabel → "POLYGONAL", Axes → False, Frame → True]
```
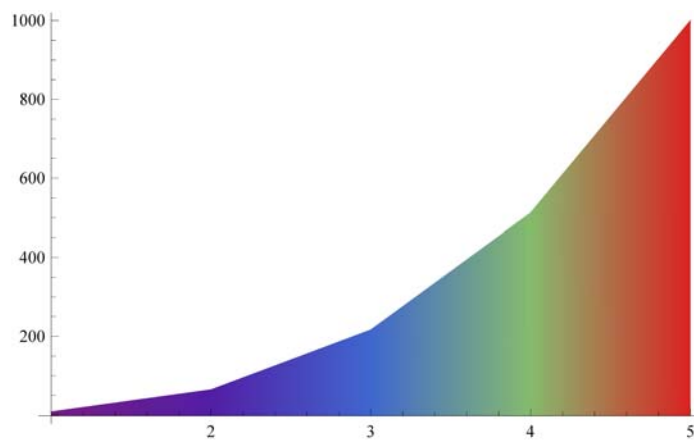
▼ ListLinePlot

```
ListLinePlot[ Table[ (i^3), {i, 2, 10, 2}]]
```
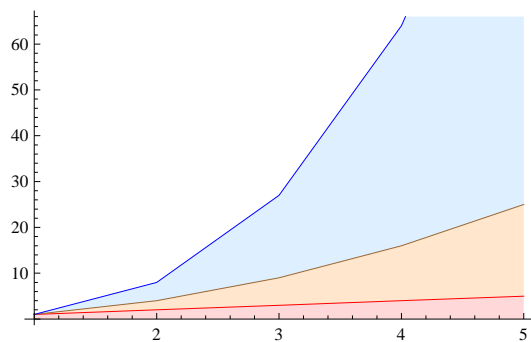


```
ListLinePlot[ Table[ (i^3), {i, 2, 10, 2}],
  ColorFunction → "Rainbow", Filling → Axis, AxesOrigin → {1, -2}]
```



```
data = { Table[ (i), {i, 1, 5}], Table[ (i^2), {i, 1, 5}], Table[ (i^3), {i, 1, 5}]};
```

```
ListLinePlot[data,
  Filling → {1 → {Axis, LightRed}, 2 → {{1}, LightOrange}, 3 → {{2}, LightBlue}},
  PlotStyle → {Red, Brown, Blue}, AxesOrigin → {1, 0}]
```
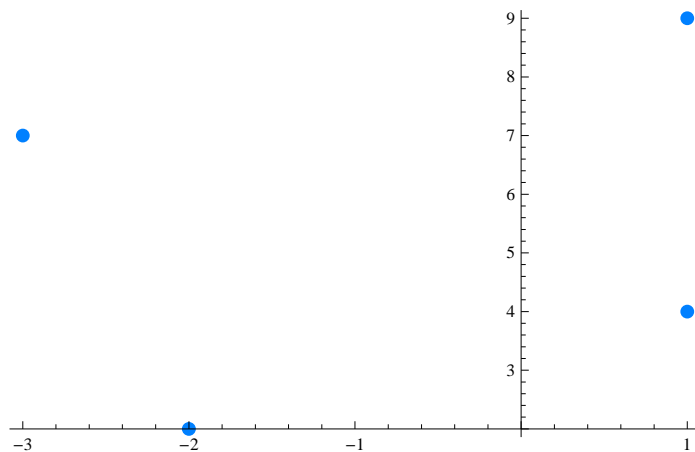

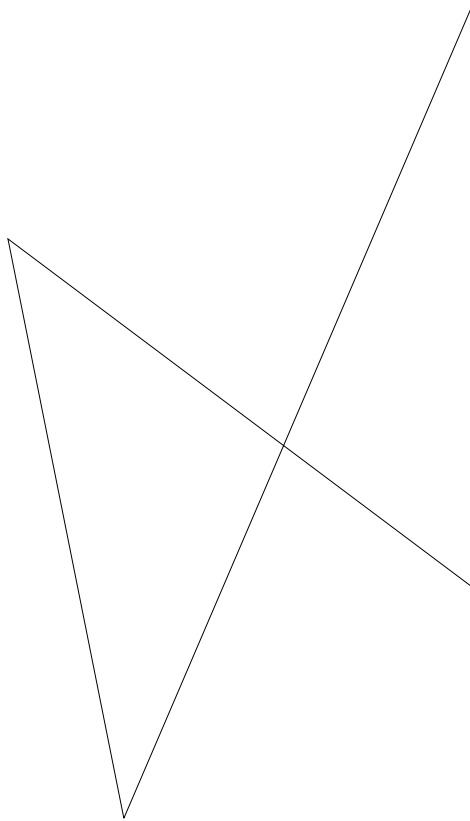## ▼ Polygonals using Graphics[Line[Points]]

Definition of the points

```
points = {{1, 9}, {-2, 2}, {-3, 7}, {1, 4}};
```

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★ **Plot the points: ListPlot[points]**

```
g1 = ListPlot[points, PlotStyle → {PointSize[0.02], RGBColor[0, 0.5, 1]}]
```


★ **Creation of the polygonal by joining the points: Graphics[Line[points]]**
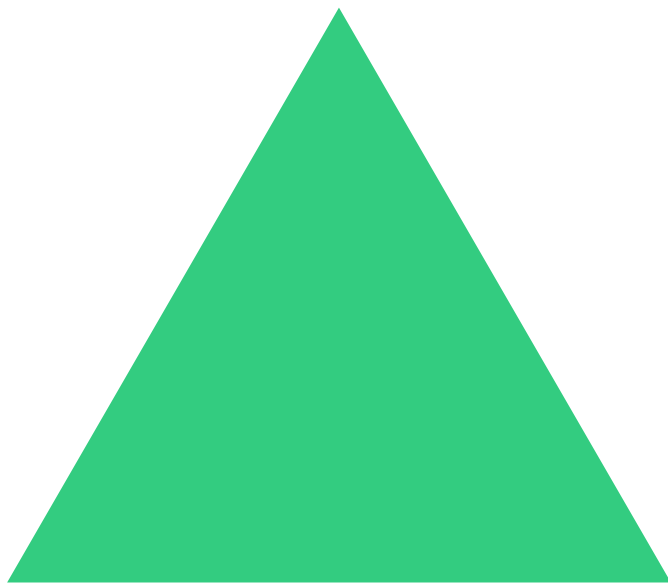
```
Graphics[Line[points]]
```


▼ **Polygons**

★ **Definition of the vertex**

```
p = Polygon[{{1, 0}, {0, Sqrt[3]}, {-1, 0}}];
```

★ **Polygon defined by some points: Graphics[Polygon[p]]**

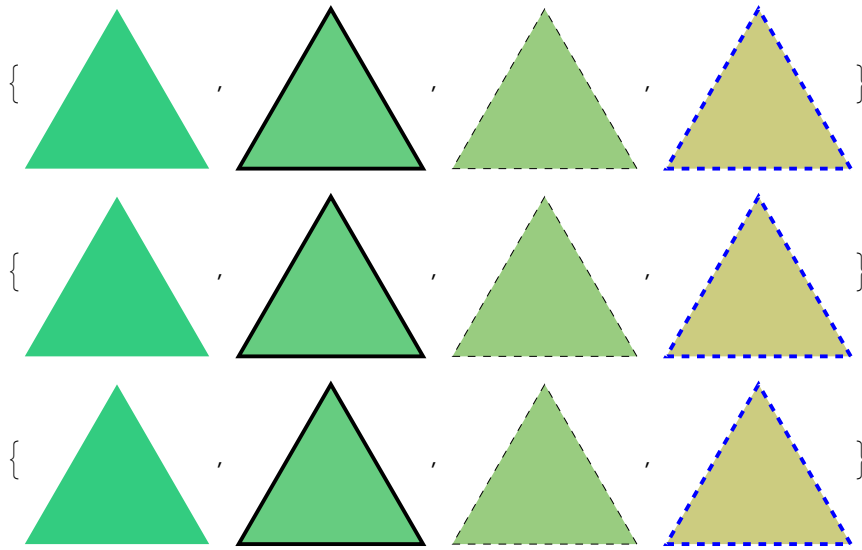`Graphics[{RGBColor[0.2, 0.8, 0.5], Polygon[{{1, 0}, {0, Sqrt[3]}, {-1, 0}}]}]`

`Graphics[{RGBColor[0, 0.5, 0.8], Polygon[{{0, 0}, {1, 1}, {0, 1}, {1, 0}}]}]`

`p = Polygon[{{1, 0}, {0, Sqrt[3]}, {-1, 0}}];`

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```
{Graphics[{RGBColor[0.2, 0.8, 0.5], p}],
 Graphics[{EdgeForm[Thick], RGBColor[0.4, 0.8, 0.5], p}],
 Graphics[{EdgeForm[Dashed], RGBColor[0.6, 0.8, 0.5], p}],
 Graphics[{EdgeForm[Directive[Thick, Dashed, Blue]], RGBColor[0.8, 0.8, 0.5], p}]}
```
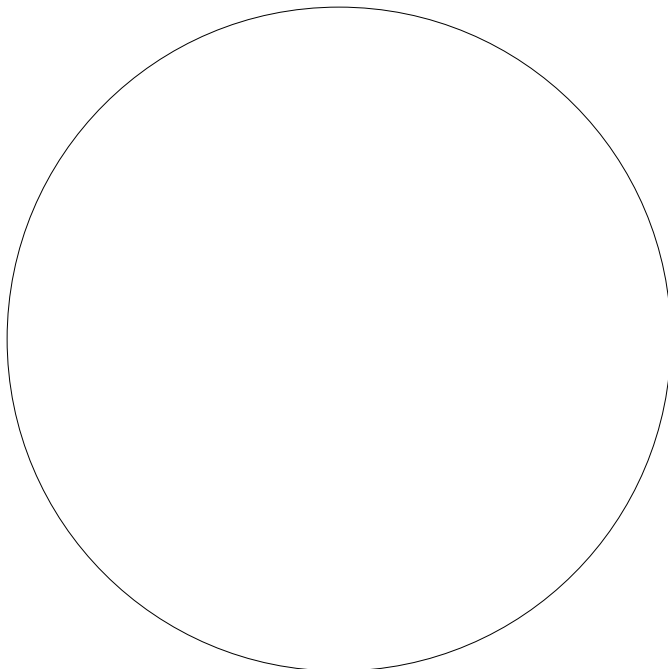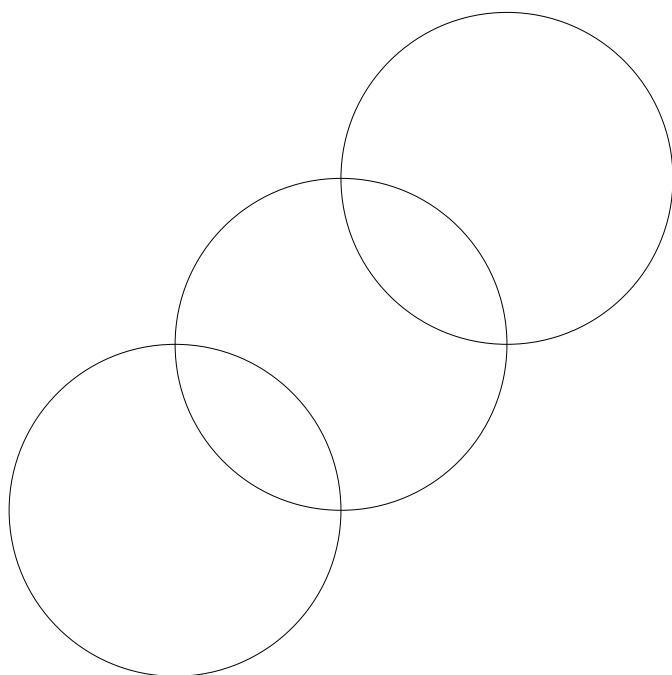

6.3. Figures in 2D

▼ Circumferences

★ **Graphics[{Circle[{a,b},r]**

```
Graphics[Circle[]]
```

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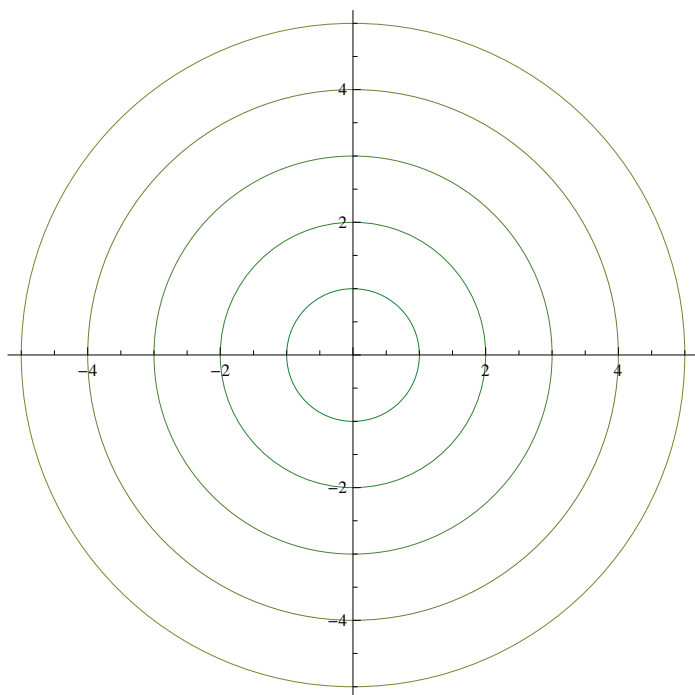Mª I. Eguia Ribero
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```
Graphics[{Circle[{0, 0}, 1], Circle[{1, 1}, 1], Circle[{2, 2}, 1]}]
```


★ **Some options**

```
Graphics[Table[{RGBColor[r * 0.1, 0.5, 0.2], Circle[{0, 0}, r]}, {r, 1, 5}], Axes → True]
```
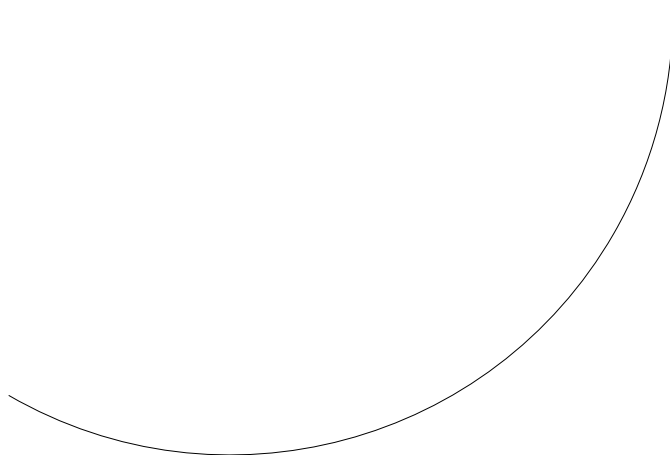

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★ **Circular arc**

`Graphics[Circle[{0, 0}, 1, {0, 4 Pi / 3}], Axes → True]`

`Graphics[Circle[{0, 0}, 1, {4 Pi / 3, 2 Pi}]]`

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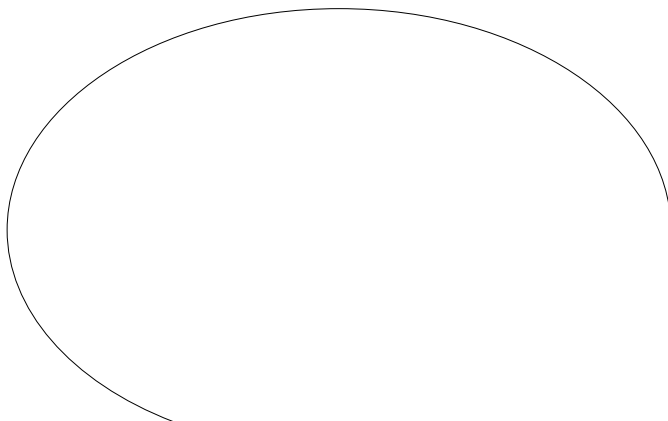
▼ Ellipses

★ **Ellipse of semi-major axis 3 and semi-minor axis 2**

```
Graphics[Circle[{0,0},{3,2}]]
```


★ **Elliptic arc**

```
Graphics[Circle[{0, 0}, {3, 2}, {0, 4 Pi / 3}]]
```

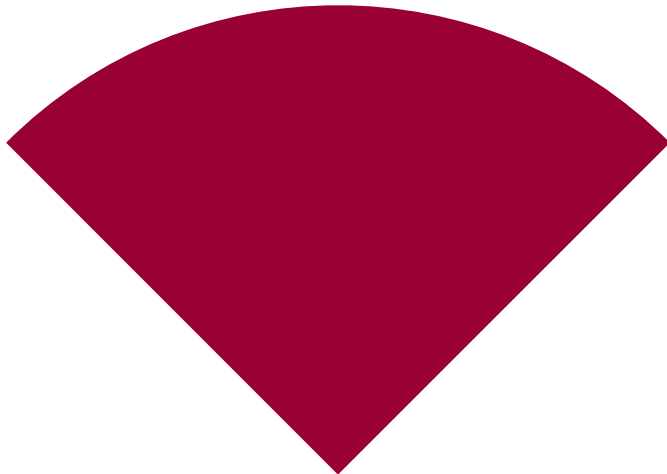E. Alberdi Celaya
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▼ Circles (Discs)

```
Graphics[Disk[]]
```


★ Circular sector

```
Graphics[{RGBColor[0.6, 0, 0.2], Disk[{0, 0}, 1, {Pi / 4, 3 Pi / 4}]}]
```

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★ **Ellipse**

```
Graphics[{RGBColor[0, 0.5, 0.2], Disk[{0, 0}, {3, 4}]}]
```


▼ Rectangles

★ **Graphics[Rectangle[]]**

```
Graphics[Rectangle[]]
```


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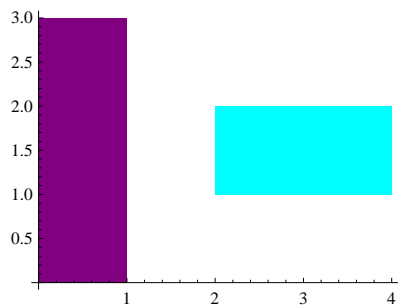Mª J. González Gómez

★ **Some options of the command Graphics[Rectangle[]]**

`Graphics[{Magenta, Rectangle[{0, 0}], Green, Rectangle[{0.5, 0.5}]}, Axes → True]`

`Graphics[{Purple, Rectangle[{0, 0}, {1, 3}], Cyan, Rectangle[{2, 1}, {4, 2}]}, Axes → True]`

`{Graphics[{Blue, Rectangle[]}], Graphics[{EdgeForm[Thick], Pink, Rectangle[]}],`
 `Graphics[{EdgeForm[Dashed], Green, Rectangle[]}],`
 `Graphics[{EdgeForm[Directive[Thick, Dashed, Blue]], Orange, Rectangle[]}]}`