

7

REPRESENTACIÓN GRÁFICA DE FUNCIONES DE VARIAS VARIABLES

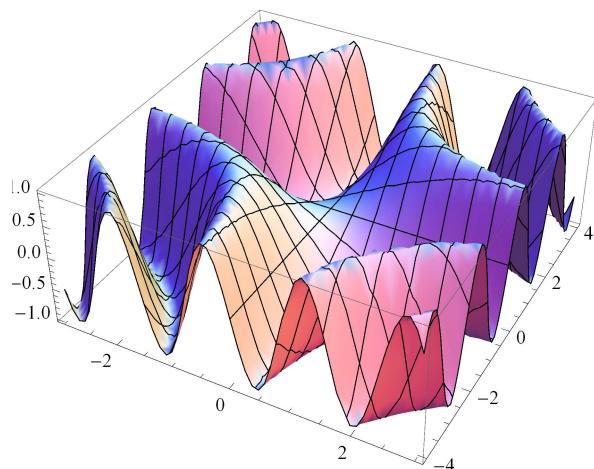
7.1. Gráficos de funciones de dos variables

▼ Función Plot3D[]

★ Plot [función , {x, xmin, xmáx},{y, ymin, ymax}]

Representación gráfica de una función de dos variables

```
Plot3D[Sin[x * y], {x, -3, 3}, {y, -4, 4}]
```



Representación gráfica de dos funciones

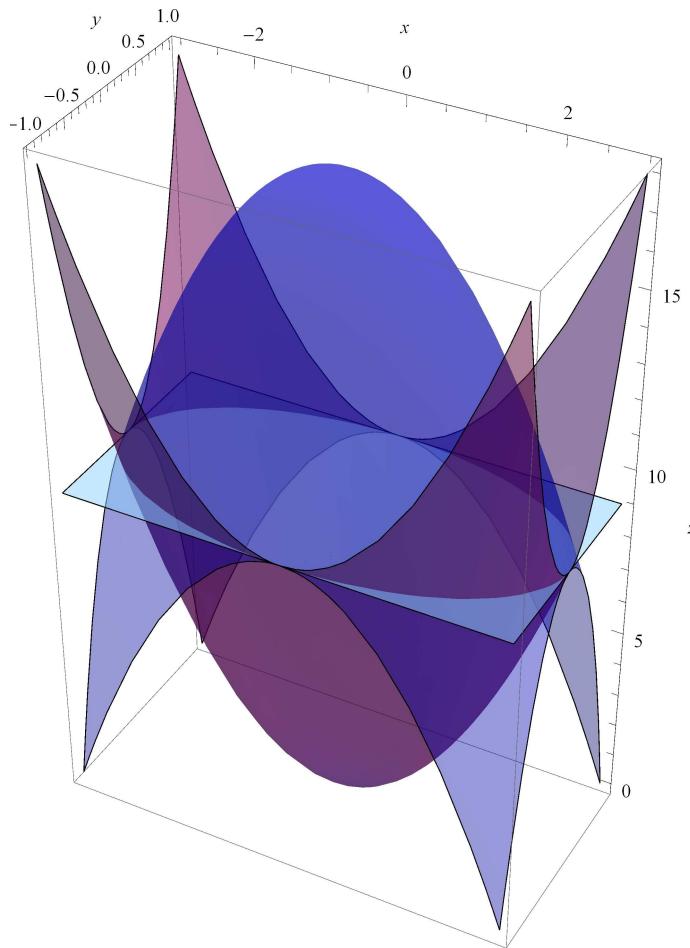
$$z1[x_, y_] = 18 - x^2 - 9 y^2$$

$$18 - x^2 - 9 y^2$$

$$z2[x_, y_] = x^2 + 9 y^2$$

$$x^2 + 9 y^2$$

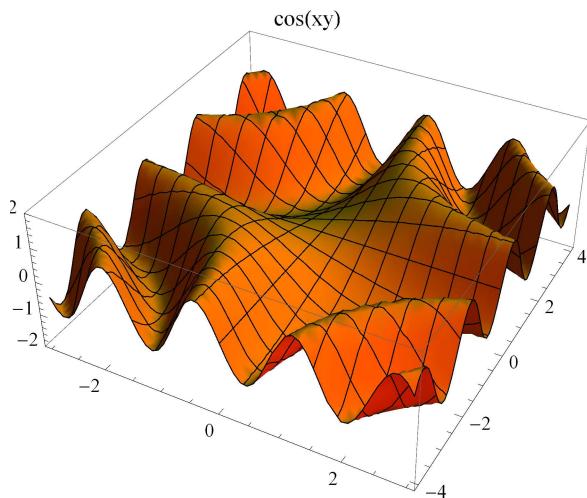
```
Plot3D[{z1[x, y], z2[x, y], 9}, {x, -3, 3}, {y, -1, 1}, BoxRatios -> {2, 1, 3},
Mesh -> False, AxesLabel -> {x, y, z}, PlotStyle -> {Directive[Blue, Opacity[0.4]],
Directive[Purple, Opacity[0.5]], Directive[LightGreen, Opacity[0.5]]}]
```



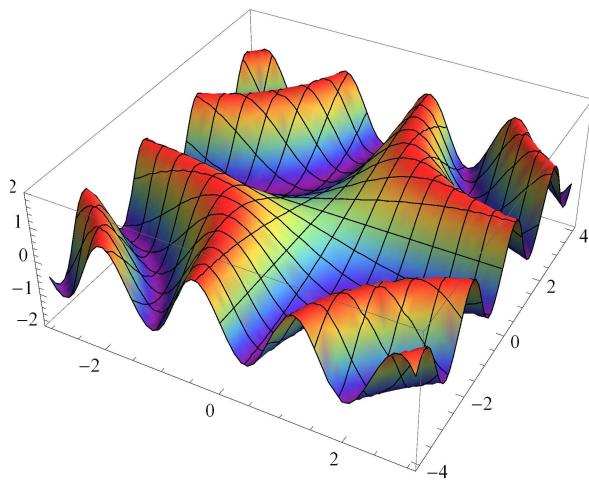
▼ Opciones de la Función Plot3D[]

★ Color, etiquetas, etc

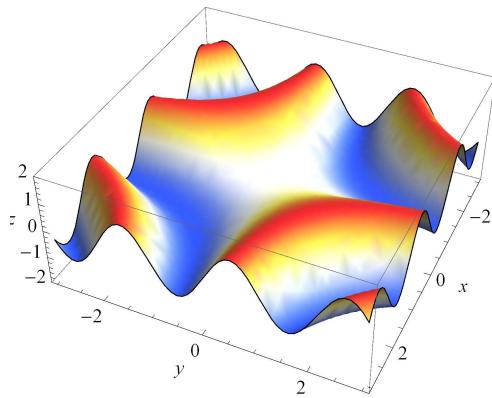
```
Plot3D[Sin[x * y], {x, -3, 3}, {y, -4, 4},
PlotRange -> {-2, 2}, PlotLabel -> "cos(xy)", PlotStyle -> Orange]
```



```
Plot3D[Sin[x * y], {x, -3, 3}, {y, -4, 4}, PlotRange → {-2, 2}, ColorFunction → "Rainbow"]
```



```
Plot3D[Sin[x * y], {x, -3, 3}, {y, -3, 3}, PlotRange → {-2, 2},  
ColorFunction → "TemperatureMap", Mesh → False, AxesLabel → {x, y, z}]
```

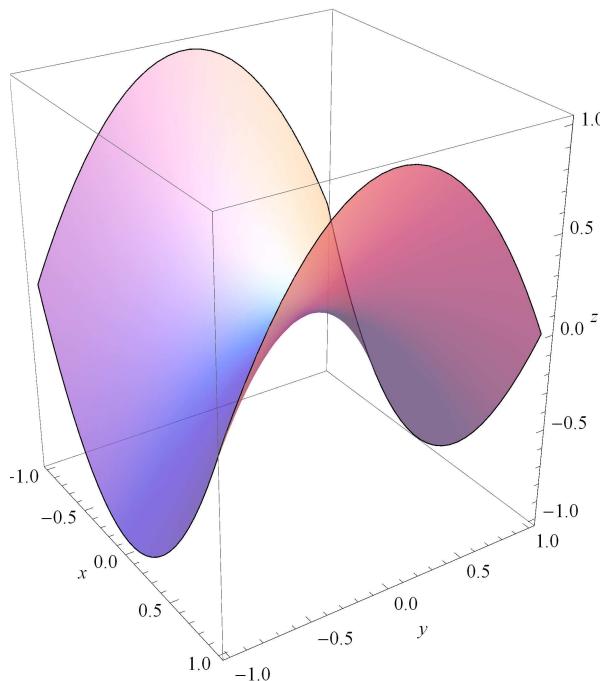


★ Proporcionalidad de los ejes y Transparencia (Opacity)

$$h[x_, y_] = x^2 - y^2$$

$$x^2 - y^2$$

```
Plot3D[h[x, y], {x, -1, 1}, {y, -1, 1}, PlotStyle -> Directive[Opacity[0.7]],
PlotPoints -> 30, Mesh -> False, BoxRatios -> {1, 1, 1.2`}, AxesLabel -> {x, y, z}]
```

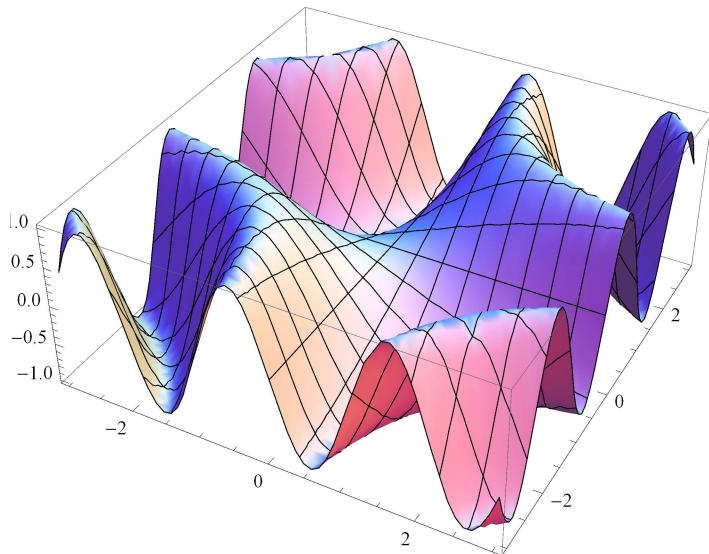


7.2 Curvas de Nivel

▼ ContourPlot[]

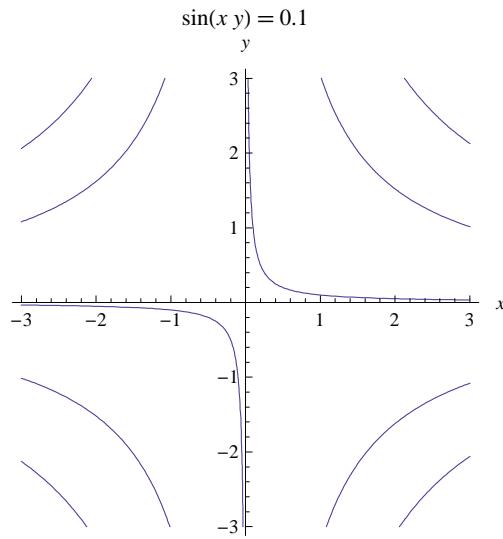
★ **ContourPlot [función ,{x, xmin, xmáx},{y, ymin, ymax}]**

```
Plot3D[Sin[x * y], {x, -3, 3}, {y, -3, 3}]
```



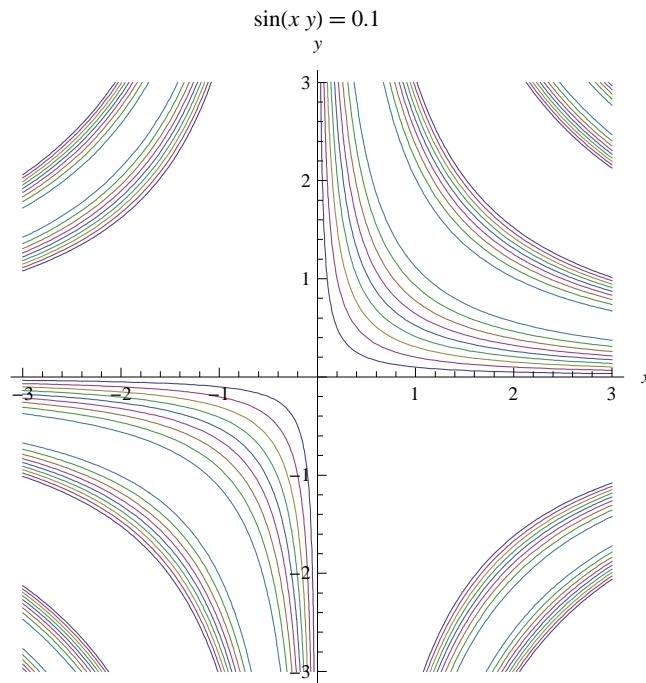
★ **ContourPlot [ecuación ,{x, xmin, xmáx},{y, ymin, ymax}]**

```
ContourPlot[Sin[x * y] == 0.1, {x, -3, 3}, {y, -3, 3},
Frame → False, Axes → True, AxesLabel → {x, y}, PlotLabel → Sin[x y] == 0.1]
```



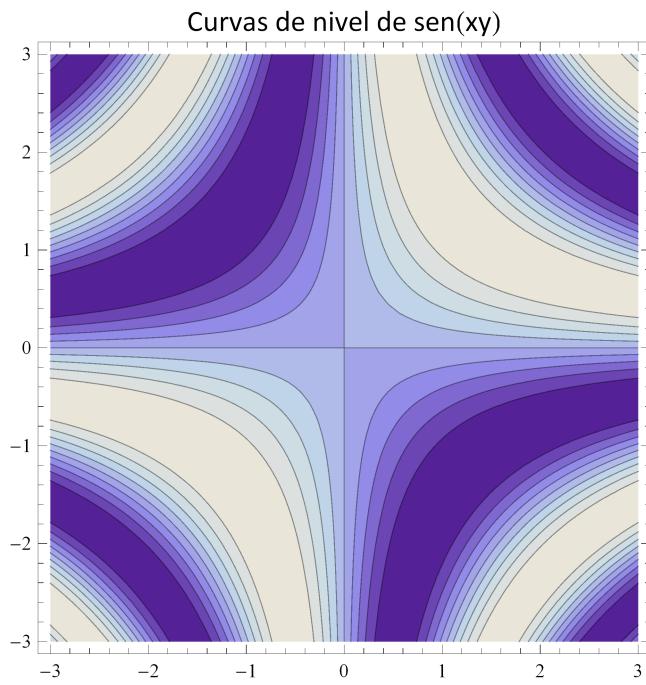
★ **ContourPlot [{ecuación 1, ecuación 2}, {x, xmin, xmáx},{y, ymin, ymax}]**

```
ContourPlot[Evaluate[Table[Sin[x * y] == 0.1 * k, {k, 1, 10}]], {x, -3, 3}, {y, -3, 3},
Frame → False, Axes → True, AxesLabel → {x, y}, PlotLabel → Sin[x y] == 0.1]
```

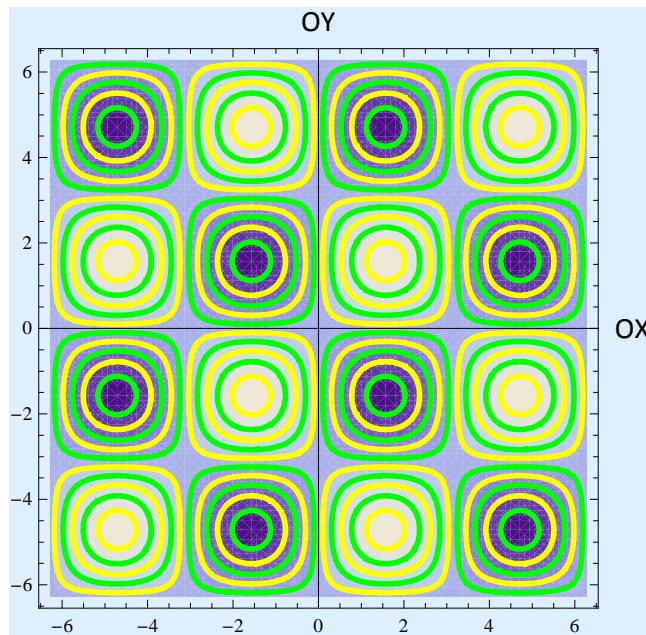


▼ Opciones de ContourPlot[]

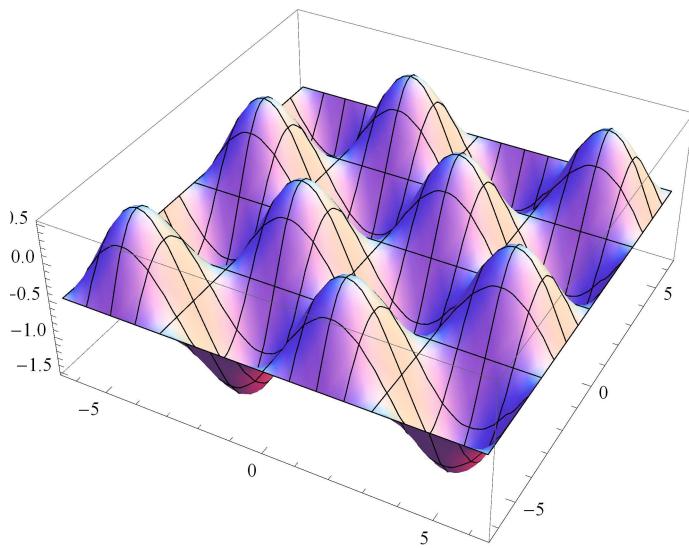
```
ContourPlot[Sin[x * y], {x, -3, 3}, {y, -3, 3}, PlotLabel -> "Curvas de nivel de sen(xy)"]
```



```
ContourPlot[{Sin[x] * Sin[y] - 0.5}, {x, -2 \pi, 2 \pi}, {y, -2 \pi, 2 \pi},
ContourStyle -> {{Thickness[0.01], Yellow}, {Thickness[0.01], Green}},
Axes -> True, AxesLabel -> {"OX", "OY"}, Background -> LightBlue]
```

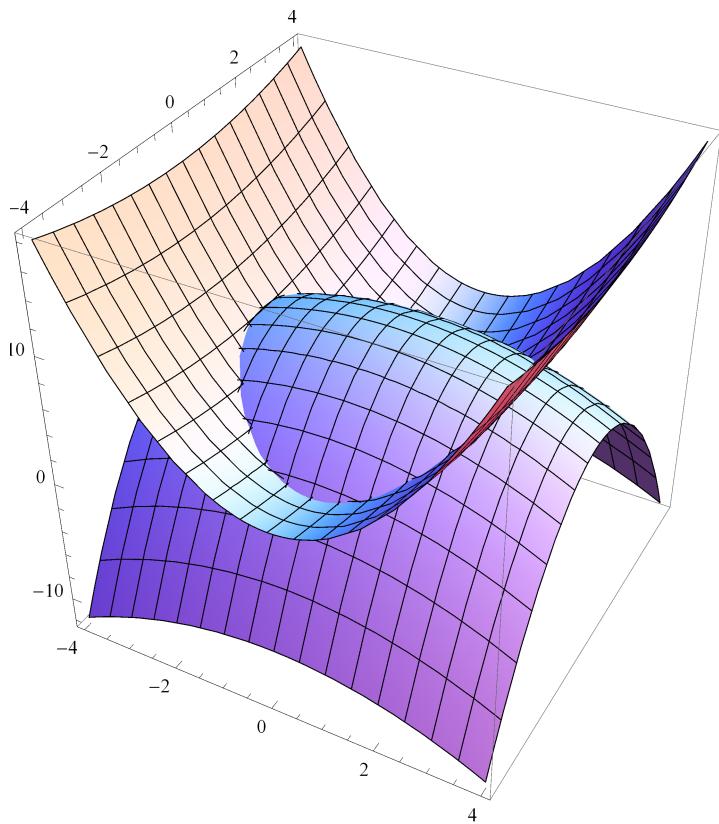


```
Plot3D[{Sin[x]*Sin[y] - 0.5}, {x, -2 π, 2 π}, {y, -2 π, 2 π}]
```

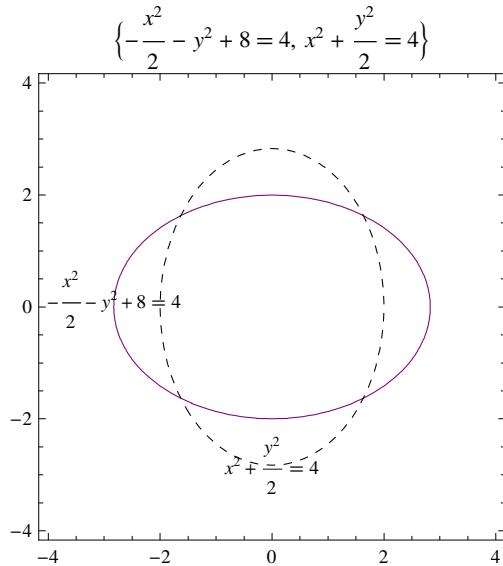


7.3 Región limitada por dos superficies

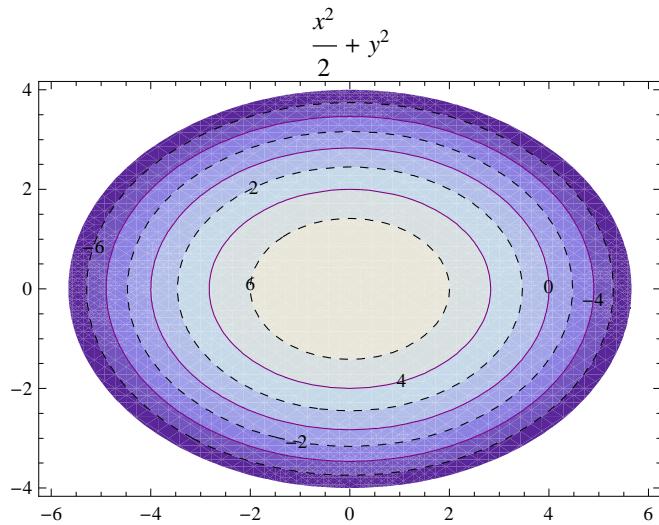
```
Plot3D[{8 - (x^2 / 4 + y^2 / 8), (x^2 + y^2 / 8)}, {x, -4, 4}, {y, -4, 4}, BoxRatios -> {1, 1, 1}]
```



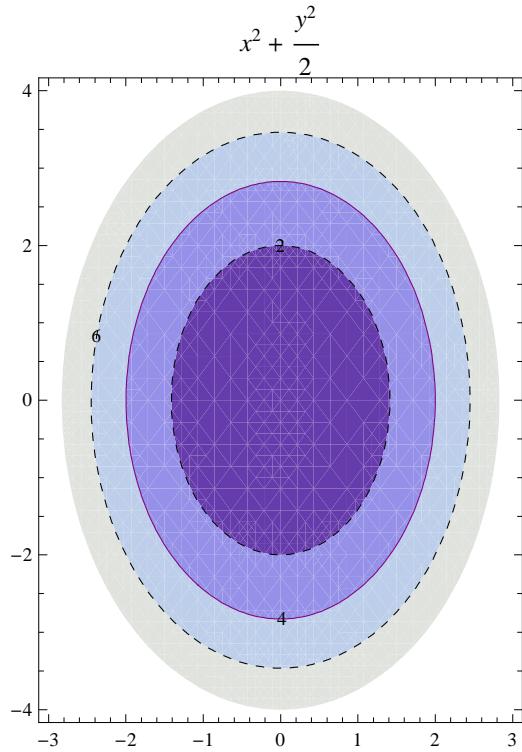
```
ContourPlot[{8 - (x^2 / 2 + y^2) == 4, (x^2 + y^2 / 2) == 4},
{x, -4, 4}, {y, -4, 4}, ContourStyle -> {Purple, Dashed},
PlotLabel -> {8 - (x^2 / 2 + y^2) == 4 , (x^2 + y^2 / 2) == 4},
AspectRatio -> Automatic, ContourLabels -> True]
```



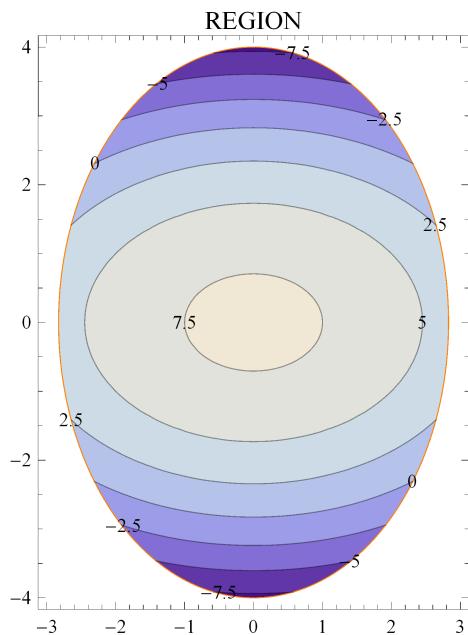
```
ContourPlot[8 - (x^2 / 2 + y^2), {x, -6, 6}, {y, -4, 4},
ContourStyle -> {Purple, Dashed}, PlotLabel -> x^2 / 2 + y^2,
AspectRatio -> Automatic, ContourLabels -> True, PlotRange -> {-8, 8}]
```



```
ContourPlot[x^2 + y^2 / 2, {x, -3, 3}, {y, -4, 4},
ContourStyle -> {Purple, Dashed}, PlotLabel -> x^2 + y^2 / 2,
AspectRatio -> Automatic, ContourLabels -> True, PlotRange -> {-8, 8}]
```



```
ContourPlot[8 - (x^2 / 2 + y^2), {x, -3, 3}, {y, -4, 4}, PlotLabel -> "REGION",
ContourLabels -> True, RegionFunction -> Function[{x, y, z}, 0 < x^2 + y^2 / 2 < 8],
BoundaryStyle -> Orange, AspectRatio -> Automatic]
```



```
Plot3D[8 - (x^2 / 2 + y^2), {x, -3, 3}, {y, -4, 4}, PlotLabel -> "REGION",
RegionFunction -> Function[{x, y, z}, 0 < x^2 + y^2 / 2 < 8],
BoundaryStyle -> Orange, AspectRatio -> Automatic]
```

