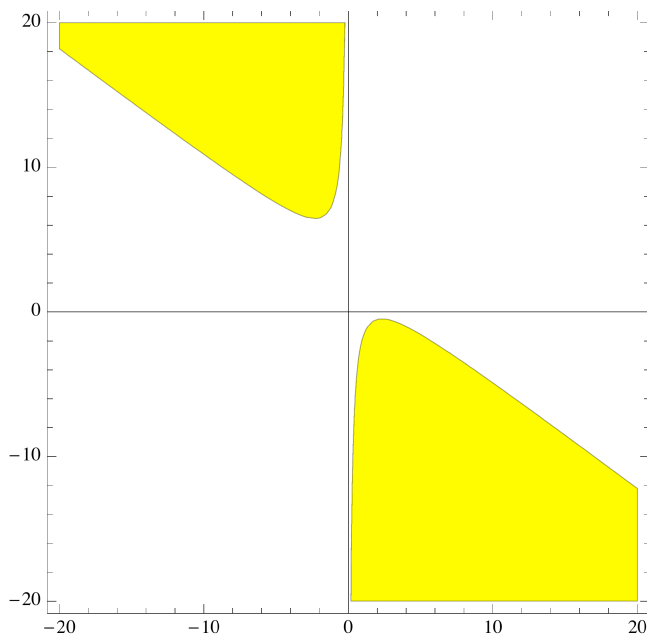


Grafico della conica $3 * x^2 + 4 * x * y - 12 * x + 16 = 0$

```
d = RegionPlot[3 * x^2 + 4 * x * y - 12 * x + 16 < 0, {x, -20, 20},
  {y, -20, 20}, AspectRatio -> Automatic, PlotStyle -> Yellow, Axes -> True]
```



Rotazione

```
Expand[3 * (x * Cos[alpha] - y * Sin[alpha])^2 +
  4 * (x * Cos[alpha] - y * Sin[alpha]) * (x * Sin[alpha] + y * Cos[alpha]) - 12 * (x * Cos[alpha] - y * Sin[alpha]) + 16]
```

$$16 - 12 x \cos[\alpha] + 3 x^2 \cos[\alpha]^2 + 4 x y \cos[\alpha]^2 + 12 y \sin[\alpha] + 4 x^2 \cos[\alpha] \sin[\alpha] - 6 x y \cos[\alpha] \sin[\alpha] - 4 y^2 \cos[\alpha] \sin[\alpha] - 4 x y \sin[\alpha]^2 + 3 y^2 \sin[\alpha]^2$$

Eliminiamo il termine rettangolare

```
Solve[+4 Cos[alpha]^2 - 6 Cos[alpha] Sin[alpha] - 4 Sin[alpha]^2 == 0, alpha]
```

Solve::ifun: Inverse functions are being used by Solve, so some solutions may not be found; use Reduce for complete solution information. >>

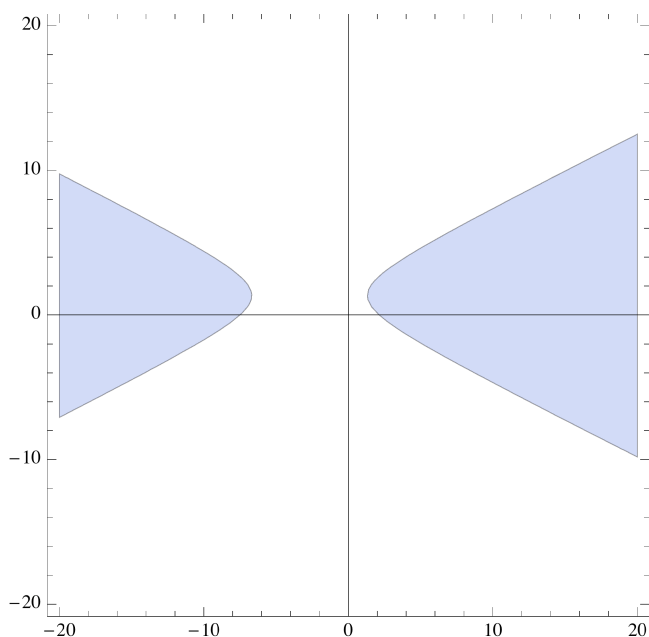
$$\left\{ \left\{ \alpha \rightarrow -\text{ArcCos}\left[-\frac{2}{\sqrt{5}}\right] \right\}, \left\{ \alpha \rightarrow \text{ArcCos}\left[-\frac{1}{\sqrt{5}}\right] \right\}, \left\{ \alpha \rightarrow -\text{ArcCos}\left[\frac{1}{\sqrt{5}}\right] \right\}, \left\{ \alpha \rightarrow \text{ArcCos}\left[\frac{2}{\sqrt{5}}\right] \right\} \right\}$$

```
Expand[
```

$$3 \left(x * \frac{1}{\sqrt{5}} - y * \frac{-2}{\sqrt{5}} \right)^2 + 4 \left(x * \frac{1}{\sqrt{5}} - y * \frac{-2}{\sqrt{5}} \right) \left(x * \frac{-2}{\sqrt{5}} + y * \frac{1}{\sqrt{5}} \right) - 12 \left(x * \frac{1}{\sqrt{5}} - y * \frac{-2}{\sqrt{5}} \right) + 16]$$

$$16 - \frac{12 x}{\sqrt{5}} - x^2 - \frac{24 y}{\sqrt{5}} + 4 y^2$$

```
druotata = RegionPlot[16 -  $\frac{12 x}{\sqrt{5}} - x^2 - \frac{24 y}{\sqrt{5}} + 4 y^2 < 0,$ 
  {x, -20, 20}, {y, -20, 20}, AspectRatio -> Automatic, Axes -> True]
```



Traslazione

```
Expand[16 -  $\frac{12 * (x - a)}{\sqrt{5}} - (x - a)^2 - \frac{24 * (y - b)}{\sqrt{5}} + 4 (y - b)^2$ ]
```

```
16 +  $\frac{12 a}{\sqrt{5}} - a^2 + \frac{24 b}{\sqrt{5}} + 4 b^2 - \frac{12 x}{\sqrt{5}} + 2 a x - x^2 - \frac{24 y}{\sqrt{5}} - 8 b y + 4 y^2$ 
```

```
Solve[- $\frac{12}{\sqrt{5}} + 2 a == 0, a$ ]
```

```
{{a ->  $\frac{6}{\sqrt{5}}$ }}
```

```
Solve[- $\frac{24}{\sqrt{5}} - 8 b == 0, b$ ]
```

```
{{b ->  $-\frac{3}{\sqrt{5}}$ }}
```

```
Expand[16 -  $\frac{12 * (x - \frac{6}{\sqrt{5}})}{\sqrt{5}} - (x - \frac{6}{\sqrt{5}})^2 - \frac{24 * (y - \frac{-3}{\sqrt{5}})}{\sqrt{5}} + 4 (y - \frac{-3}{\sqrt{5}})^2$ ]
```

```
16 - x2 + 4 y2
```

```
danchetraslata = RegionPlot[16 - x2 + 4 y2 < 0, {x, -20, 20},
  {y, -20, 20}, AspectRatio → Automatic, PlotStyle → Red, Axes → True]
```

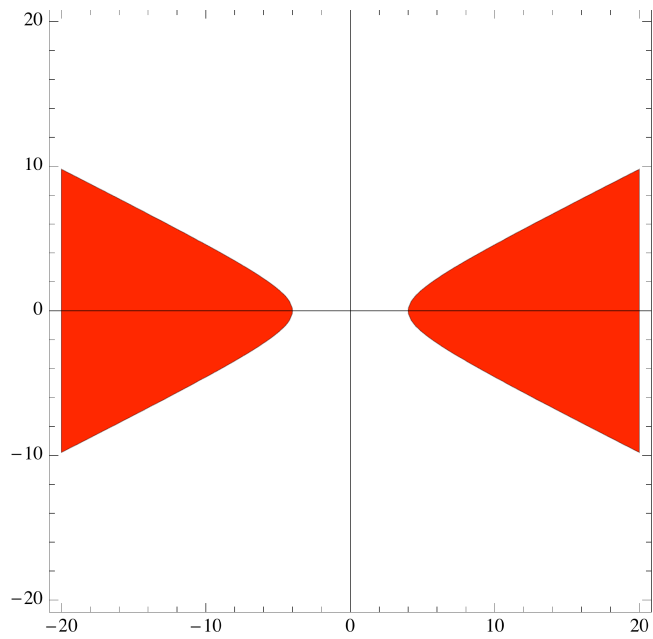


Grafico riassuntivo

```
Show[d, druotata, danchetraslata]
```

