



$$\begin{aligned}
& \frac{1}{9} 2^{2/3} (173 + 3\sqrt{3297})^{1/3} - \frac{i 2^{2/3} (173 + 3\sqrt{3297})^{1/3}}{3\sqrt{3}} - \\
& \left. \frac{i (173 + 3\sqrt{3297})^{2/3}}{6 \cdot 2^{2/3} \sqrt{3}} + \frac{1}{9} 2^{2/3} \left( \left( \frac{173}{2} - \frac{3\sqrt{3297}}{2} \right) (173 + 3\sqrt{3297}) \right)^{1/3} \right), \\
\mathbf{x} \rightarrow & -\frac{2}{3} - \frac{1}{6} (1 + i\sqrt{3}) \left( \frac{173}{2} - \frac{3\sqrt{3297}}{2} \right)^{1/3} - \frac{1}{6} (1 - i\sqrt{3}) \left( \frac{1}{2} (173 + 3\sqrt{3297}) \right)^{1/3} \}, \\
\{\mathbf{y} \rightarrow & \sqrt{\left( -\frac{5}{9} + \frac{2}{9} \left( \frac{173}{2} - \frac{3\sqrt{3297}}{2} \right)^{1/3} + \frac{2i \left( \frac{173}{2} - \frac{3\sqrt{3297}}{2} \right)^{1/3}}{3\sqrt{3}} - \right.} \\
& \frac{1}{18} \left( \frac{173}{2} - \frac{3\sqrt{3297}}{2} \right)^{2/3} + \frac{i \left( \frac{173}{2} - \frac{3\sqrt{3297}}{2} \right)^{2/3}}{6\sqrt{3}} - \frac{1}{18} \left( \frac{1}{2} (173 + 3\sqrt{3297}) \right)^{2/3} + \\
& \left. \frac{1}{9} 2^{2/3} (173 + 3\sqrt{3297})^{1/3} - \frac{i 2^{2/3} (173 + 3\sqrt{3297})^{1/3}}{3\sqrt{3}} - \right.} \\
& \left. \frac{i (173 + 3\sqrt{3297})^{2/3}}{6 \cdot 2^{2/3} \sqrt{3}} + \frac{1}{9} 2^{2/3} \left( \left( \frac{173}{2} - \frac{3\sqrt{3297}}{2} \right) (173 + 3\sqrt{3297}) \right)^{1/3} \right), \\
\mathbf{x} \rightarrow & -\frac{2}{3} - \frac{1}{6} (1 + i\sqrt{3}) \left( \frac{173}{2} - \frac{3\sqrt{3297}}{2} \right)^{1/3} - \frac{1}{6} (1 - i\sqrt{3}) \left( \frac{1}{2} (173 + 3\sqrt{3297}) \right)^{1/3} \}, \\
\{\mathbf{y} \rightarrow & -\sqrt{\left( -\frac{5}{9} + \frac{2}{9} \left( \frac{173}{2} - \frac{3\sqrt{3297}}{2} \right)^{1/3} - \frac{2i \left( \frac{173}{2} - \frac{3\sqrt{3297}}{2} \right)^{1/3}}{3\sqrt{3}} - \right.} \\
& \frac{1}{18} \left( \frac{173}{2} - \frac{3\sqrt{3297}}{2} \right)^{2/3} - \frac{i \left( \frac{173}{2} - \frac{3\sqrt{3297}}{2} \right)^{2/3}}{6\sqrt{3}} - \frac{1}{18} \left( \frac{1}{2} (173 + 3\sqrt{3297}) \right)^{2/3} + \\
& \left. \frac{1}{9} 2^{2/3} (173 + 3\sqrt{3297})^{1/3} + \frac{i 2^{2/3} (173 + 3\sqrt{3297})^{1/3}}{3\sqrt{3}} + \right.} \\
& \left. \frac{i (173 + 3\sqrt{3297})^{2/3}}{6 \cdot 2^{2/3} \sqrt{3}} + \frac{1}{9} 2^{2/3} \left( \left( \frac{173}{2} - \frac{3\sqrt{3297}}{2} \right) (173 + 3\sqrt{3297}) \right)^{1/3} \right), \\
\mathbf{x} \rightarrow & -\frac{2}{3} - \frac{1}{6} (1 - i\sqrt{3}) \left( \frac{173}{2} - \frac{3\sqrt{3297}}{2} \right)^{1/3} - \frac{1}{6} (1 + i\sqrt{3}) \left( \frac{1}{2} (173 + 3\sqrt{3297}) \right)^{1/3} \},
\end{aligned}$$

$$\left\{ y \rightarrow \sqrt{\left( -\frac{5}{9} + \frac{2}{9} \left( \frac{173}{2} - \frac{3\sqrt{3297}}{2} \right)^{1/3} - \frac{2i \left( \frac{173}{2} - \frac{3\sqrt{3297}}{2} \right)^{1/3}}{3\sqrt{3}} - \frac{1}{18} \left( \frac{173}{2} - \frac{3\sqrt{3297}}{2} \right)^{2/3} - \frac{i \left( \frac{173}{2} - \frac{3\sqrt{3297}}{2} \right)^{2/3}}{6\sqrt{3}} - \frac{1}{18} \left( \frac{1}{2} (173 + 3\sqrt{3297}) \right)^{2/3} + \frac{1}{9} 2^{2/3} (173 + 3\sqrt{3297})^{1/3} + \frac{i 2^{2/3} (173 + 3\sqrt{3297})^{1/3}}{3\sqrt{3}} + \frac{i (173 + 3\sqrt{3297})^{2/3}}{6 \cdot 2^{2/3} \sqrt{3}} + \frac{1}{9} 2^{2/3} \left( \left( \frac{173}{2} - \frac{3\sqrt{3297}}{2} \right) (173 + 3\sqrt{3297}) \right)^{1/3} \right)}, \right.$$

$$\left. x \rightarrow -\frac{2}{3} - \frac{1}{6} (1 - i\sqrt{3}) \left( \frac{173}{2} - \frac{3\sqrt{3297}}{2} \right)^{1/3} - \frac{1}{6} (1 + i\sqrt{3}) \left( \frac{1}{2} (173 + 3\sqrt{3297}) \right)^{1/3} \right\}$$

In[4]= **NSolve**[{eq1, eq2}, {x, y}]

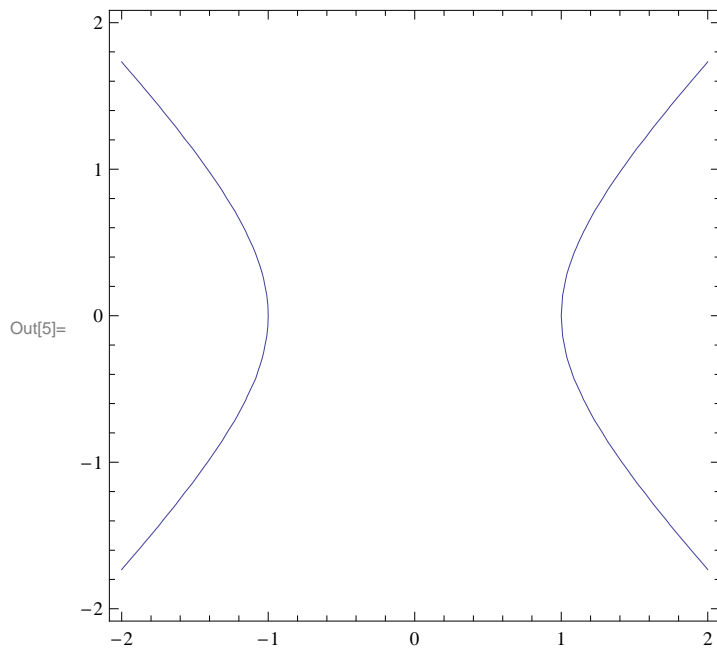
Out[4]= {{x → -1.71441 + 1.39998 i, y → 1.54589 - 1.55259 i},  
 {x → -1.71441 - 1.39998 i, y → 1.54589 + 1.55259 i}, {x → 1.42882, y → -1.02055},  
 {x → -1.71441 - 1.39998 i, y → -1.54589 - 1.55259 i},  
 {x → -1.71441 + 1.39998 i, y → -1.54589 + 1.55259 i}, {x → 1.42882, y → 1.02055}}

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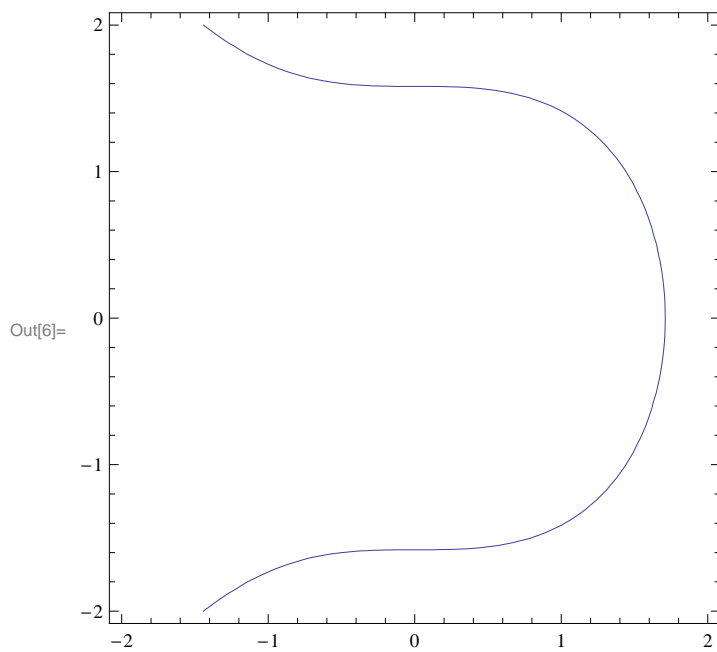
## Solution 1: Using "FindRoot" built-in function:

- We need first to plot the equations in order to have an idea about reasonable guesses :

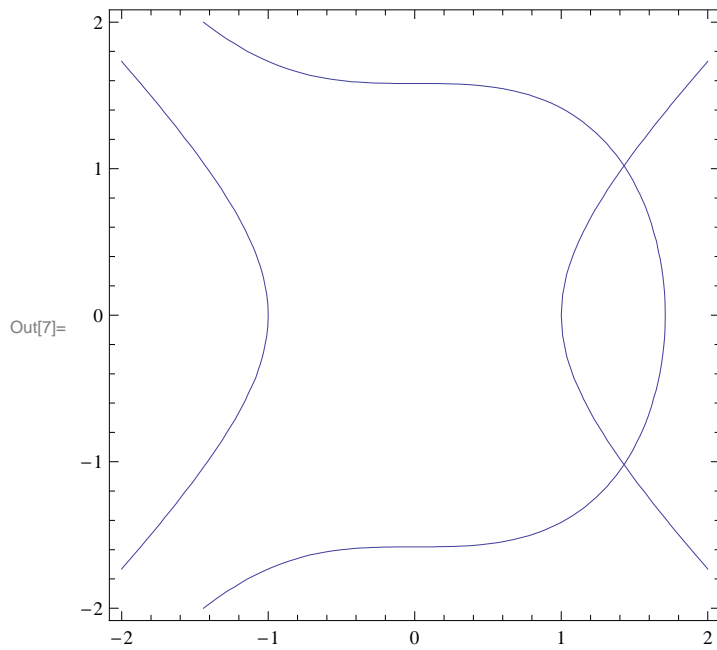
```
In[5]:= p1 = ContourPlot[x^2 - y^2 == 1, {x, -2, 2}, {y, -2, 2}]
```



```
In[6]:= p2 = ContourPlot[x^3 + 2 y^2 == 5, {x, -2, 2}, {y, -2, 2}]
```



```
In[7]:= Show[p1, p2]
```



### ■ First Solution

```
In[9]:= FindRoot[{eq1, eq2}, {x, 1}, {y, 1}]
```

```
Out[9]= {x -> 1.42882, y -> 1.02055}
```

### ■ Second Solution

```
In[10]:= FindRoot[{eq1, eq2}, {x, 1}, {y, -1}]
```

```
Out[10]= {x -> 1.42882, y -> -1.02055}
```

### ■ Exercise : will be given in the lab