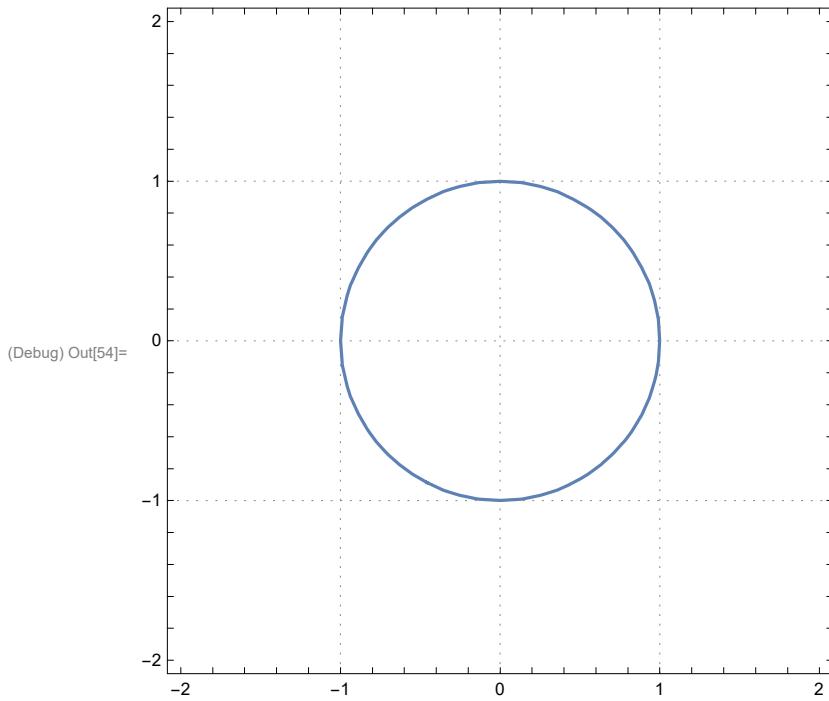
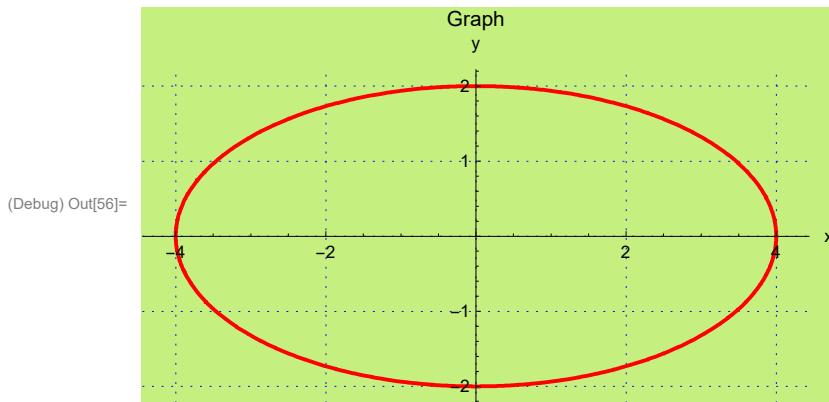


```
(Debug) In[54]:= ContourPlot[x^2 + y^2 == 1, {x, -2, 2}, {y, -2, 2},
 GridLines → Automatic, GridLinesStyle → {{Gray, Dotted}, {Gray, Dotted}}]
```



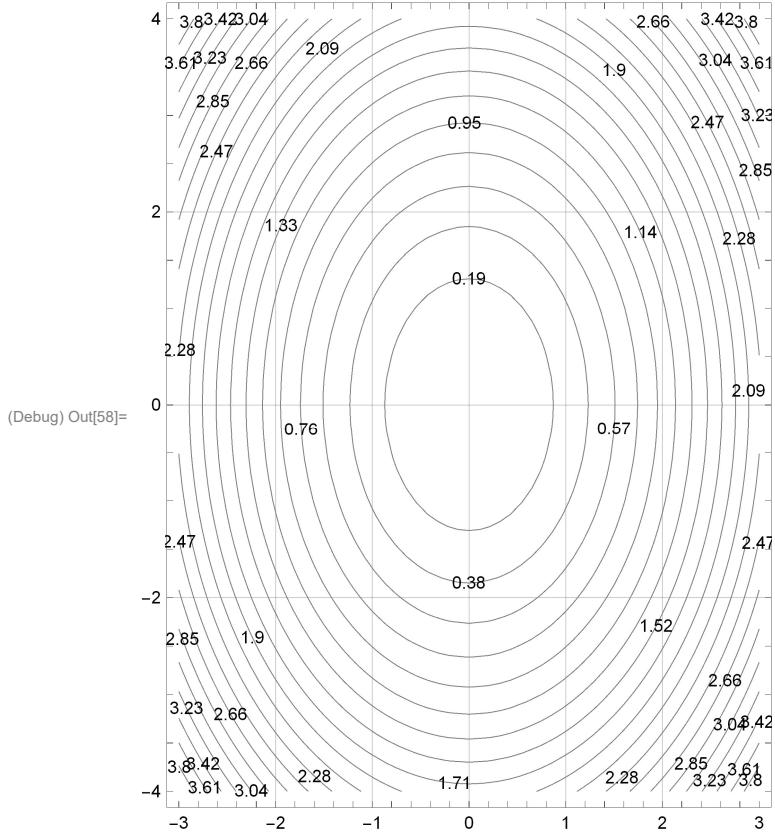
```
(Debug) In[55]:= l[t_] := {4 Cos[t], 2 Sin[t]};
```

```
(Debug) In[56]:= ellipse = ParametricPlot[l[t], {t, 0, 2 π},
 Background → RGBColor[0.77, 0.94, 0.5], PlotStyle → {Thick, Red},
 AxesLabel → {"x", "y"}, PlotLabel → "Graph", GridLines → Automatic,
 GridLinesStyle → {{Gray, Dotted, Blue}, {Gray, Dotted, Blue}}]
```



```
(Debug) In[57]:= a1 = ContourPlot[x^2/4 + y^2/9 == 1, {x, -3, 3},
 {y, -4, 4}, AspectRatio → Automatic, GridLines → Automatic];
```

(Debug) In[58]:=  $a2 = \text{ContourPlot}\left[\frac{x^2}{4} + \frac{y^2}{9}, \{x, -3, 3\}, \{y, -4, 4\}, \text{AspectRatio} \rightarrow \text{Automatic}, \text{GridLines} \rightarrow \text{Automatic}, \text{ContourShading} \rightarrow \text{False}, \text{Contours} \rightarrow 20, \text{ContourLabels} \rightarrow \text{True}\right]$



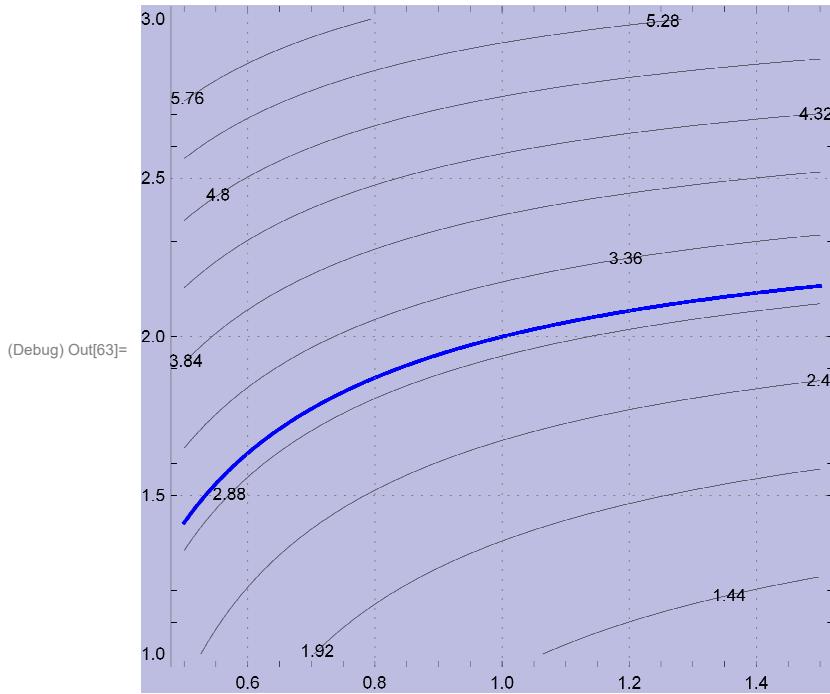
(Debug) In[59]:=  $\text{DSolve}\left[y'[x] == \frac{1}{x^2 y[x]}, y[x], x\right]$

(Debug) Out[59]=  $\left\{\left\{y[x] \rightarrow -\frac{\sqrt{2} \sqrt{-1+x C[1]}}{\sqrt{x}}\right\}, \left\{y[x] \rightarrow \frac{\sqrt{2} \sqrt{-1+x C[1]}}{\sqrt{x}}\right\}\right\}$

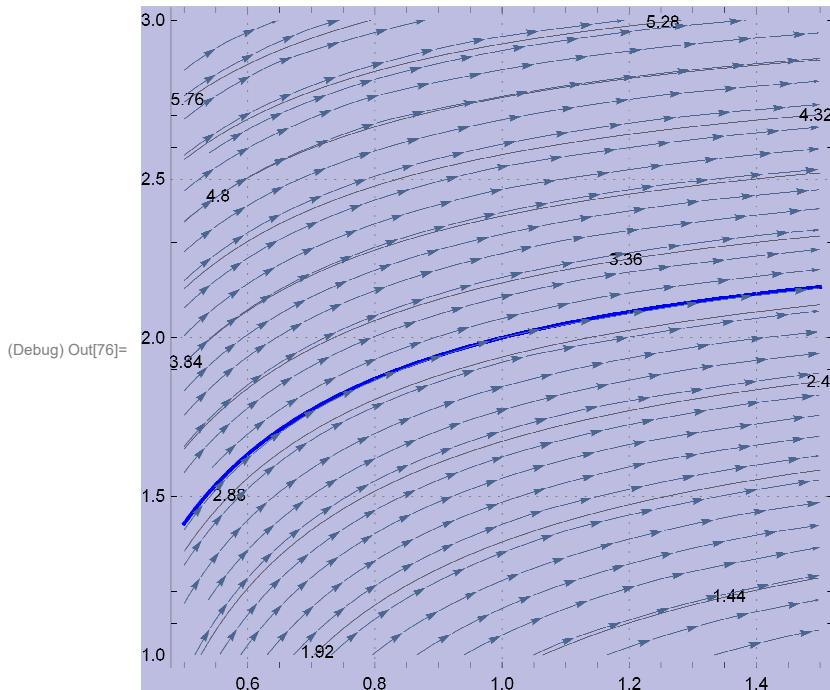
(Debug) In[60]:=  $h[x_, y_] := \frac{y^2}{2} + \frac{1}{x};$

(Debug) In[61]:=  $sols = \text{ContourPlot}[h[x, y], \{x, .5, 1.5\}, \{y, 1, 3\}, \text{ContourShading} \rightarrow \text{False}, \text{ContourLabels} \rightarrow \text{True}, \text{Contours} \rightarrow 10, \text{GridLines} \rightarrow \text{Automatic}, \text{GridLinesStyle} \rightarrow \{\{\text{Gray}, \text{Dotted}\}, \{\text{Gray}, \text{Dotted}\}\}, \text{Background} \rightarrow \text{RGBColor}[0.5, 0.5, 0.77, 0.52]];$

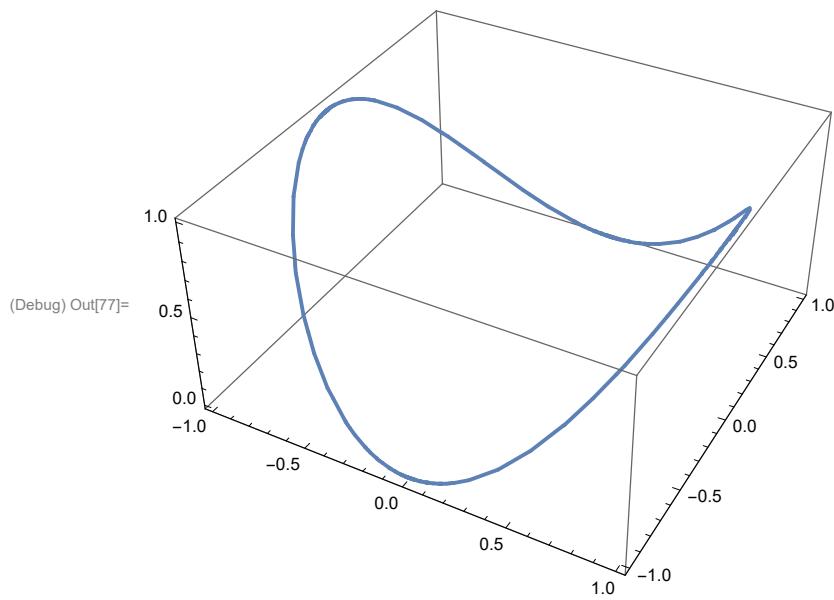
(Debug) In[62]:=  $\text{contour3} = \text{ContourPlot}[h[x, y] == 3, \{x, .5, 1.5\}, \{y, 1, 3\}, \text{ContourStyle} \rightarrow \{\text{Thick, Blue}\}];$

(Debug) In[63]:= **Show**[*sols*, *contour3*](Debug) In[64]:= **v**[*x*\_ , *y*\_ ] := {*y*, 1 / *x*<sup>2</sup>}

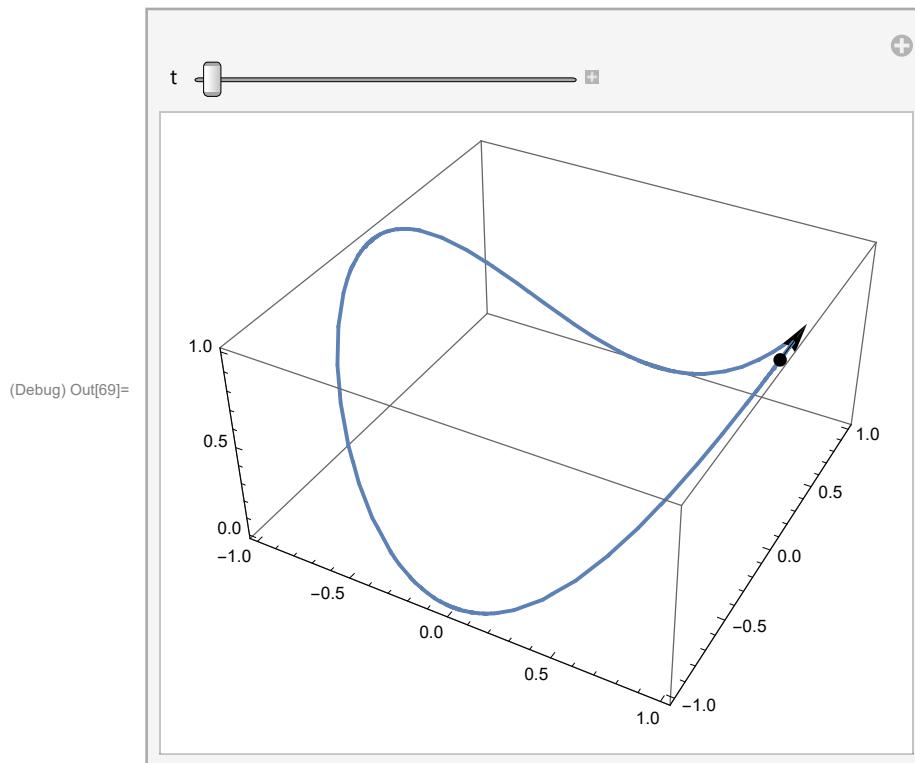
$$\frac{v_2}{v_1} = \frac{1}{x^2 y}, \quad v_2 = \frac{1}{x^2}; \quad v_1 = y$$

(Debug) In[75]:= **field** = **StreamPlot**[{*y*, 1 / *x*<sup>2</sup>}, {*x*, .5, 1.5}, {*y*, 1, 3}];(Debug) In[76]:= **Show**[*sols*, *contour3*, *field*](Debug) In[67]:= **circ**[*t*\_ ] := {Cos[*t*], Sin[*t*], Cos[*t*]<sup>2</sup>};

```
(Debug) In[77]:= graphCirc = ParametricPlot3D[circ[t], {t, 0, 2π}]
```



```
(Debug) In[69]:= Manipulate[Show[graphCirc, Graphics3D[{PointSize[Large], Point[circ[t]]}],  
Graphics3D[Arrow[{circ[t], circ[t] + .3 circ'[t]}]]], {t, 0, 2π}]
```



```
(Debug) In[70]:= Export["vec.gif",  
Manipulate[Show[graphCirc, Graphics3D[{PointSize[Large], Point[circ[t]]}],  
Graphics3D[Arrow[{circ[t], circ[t] + .3 circ'[t]}]]], {t, 0, 2π}]]
```

```
(Debug) Out[70]= vec.gif
```

```
(Debug) In[71]:= SystemOpen[DirectoryName[AbsoluteFileName["vec.gif"]]]
```

```
(Debug) In[72]:= vec = Graphics[Arrow[{circ[t], circ[t] + .5 circ'[t]}]];
```

```
(Debug) In[78]:= sphere = ParametricPlot3D[Cos[\lambda] {Cos[\theta], Sin[\theta], 0} + {0, 0, Sin[\lambda]},  
{\theta, -\pi, \pi}, {\lambda, -\pi/2, \pi/2}, PlotStyle -> {Opacity[.5], Green}]
```

