In[1]:=
```
(* 2D vector field *)
F = {x^2 + y^3, x^4 + y^5};
(* a circle around (x,y) with radiu r *)
q = {x + r Cos[t], y + r Sin[t]};
Foq = F /. {x → q[[1]], y → q[[2]]}
qt = D[q, t]
qtperp = {qt[[2]], -qt[[1]]}
area = r^2 Pi;
```

Out[3]= $\left\{\left(x + r \operatorname{Cos}[t]\right)^2 + \left(y + r \operatorname{Sin}[t]\right)^3,\ \left(x + r \operatorname{Cos}[t]\right)^4 + \left(y + r \operatorname{Sin}[t]\right)^5\right\}$

Out[4]= $\left\{-r \operatorname{Sin}[t],\ r \operatorname{Cos}[t]\right\}$

Out[5]= $\left\{r \operatorname{Cos}[t],\ r \operatorname{Sin}[t]\right\}$

In[7]:=
```
(* flux density *)
flux = Integrate[Dot[Foq, qtperp], {t, 0, 2 Pi}];
fluxdens = Limit[Expand[flux / area], r → 0]
```

Out[8]= $2 x + 5 y^4$

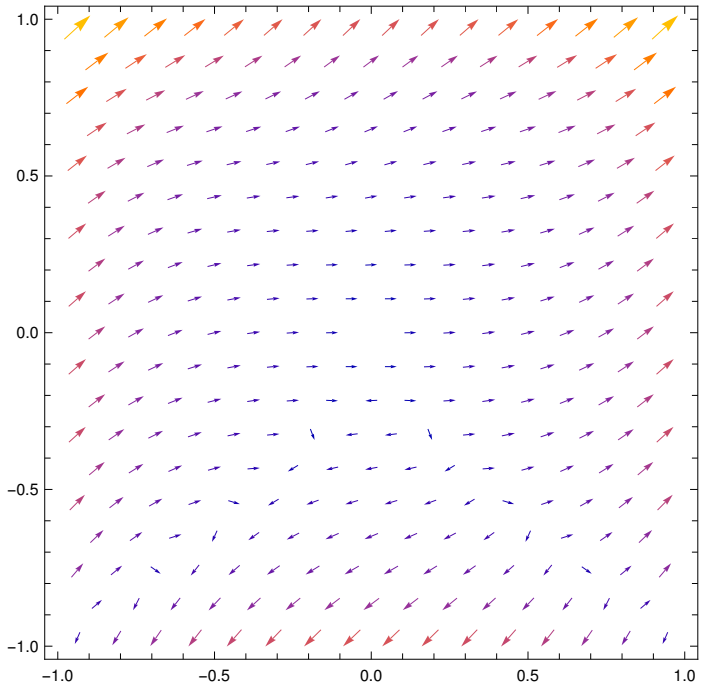
In[9]:=
```
(* circulation density *)
circ = Integrate[Dot[Foq, qt], {t, 0, 2 Pi}];
circdens = Limit[Expand[circ / area], r → 0]
```

Out[10]=

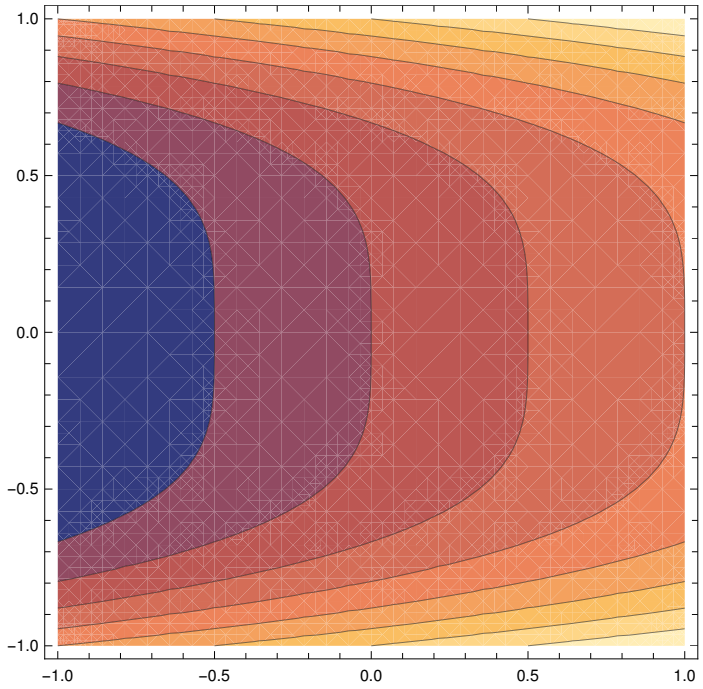
$4 x^3 - 3 y^2$

In[28]:=
```
VectorPlot[F, {x, -1, 1}, {y, -1, 1}, VectorScaling → True]
ContourPlot[fluxdens, {x, -1, 1}, {y, -1, 1}]
ContourPlot[circdens, {x, -1, 1}, {y, -1, 1}]
```

Out[28]=



Out[29]=



Out[30]=