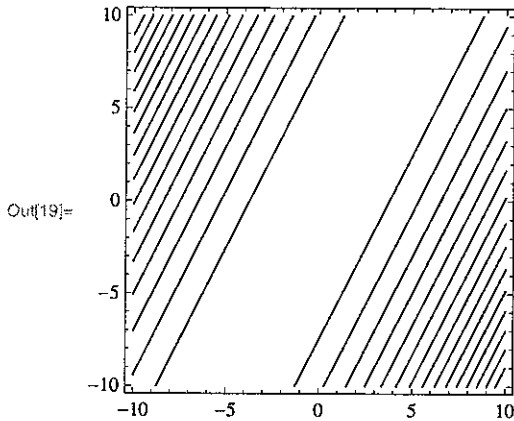


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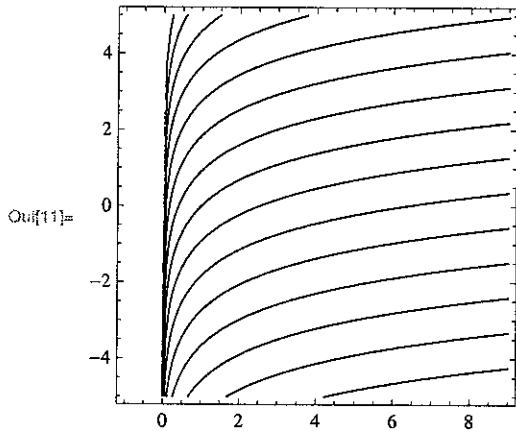
In[19]:= `ContourPlot[(y - 2 x)^2, {x, -10, 10}, {y, -10, 10}, Contours -> 15, ContourShading -> None, ContourStyle -> Black, ImageSize -> {200, 200}]`

1.



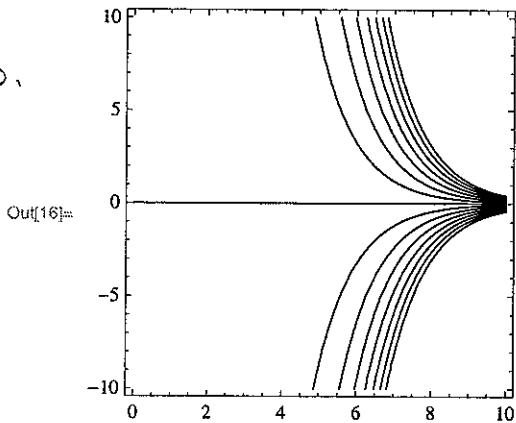
In[11]:= `ContourPlot[y - Log[x], {x, -1, 9}, {y, -5, 5}, Contours -> 15, ContourShading -> None, ContourStyle -> Black, ImageSize -> {200, 200}]`

2.

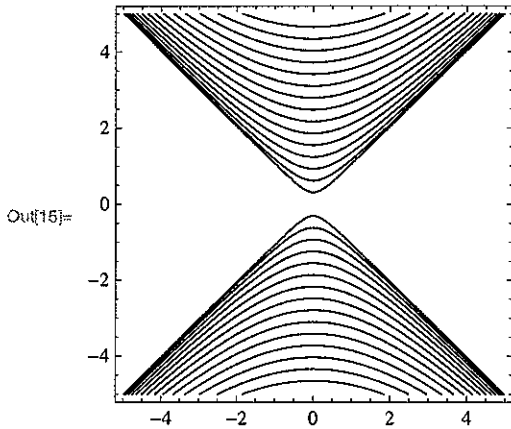


In[16]:= `ContourPlot[y + E^x, {x, 0, 10}, {y, -10, 10}, Contours -> 15, ContourShading -> None, ContourStyle -> Black, ImageSize -> {200, 200}]`

3.



```
In[15]:= ContourPlot[Sqrt[y^2 - x^2], {x, -5, 5}, {y, -5, 5}, Contours -> 15,
ContourShading -> None, ContourStyle -> Black, ImageSize -> {200, 200}]
```



$$1. \quad -32 + 4(-8)(25) = -32 \cdot 26$$

$$2. \quad y=0 : \lim_{x \rightarrow 0} \frac{0}{x^4 + 0} = +\infty$$

\Rightarrow DNE

$$x=0 : \lim_{y \rightarrow 0} \frac{y^4}{0 + 3y^4} = \frac{1}{3}$$

$$3. \quad y=0 : \lim_{x \rightarrow 0} \frac{0}{3x^2} = 0$$

\Rightarrow DNE

$$x=y : \lim_{x \rightarrow 0} \frac{x^2 \cos x}{4x^2} = \frac{1}{4}$$

$$4. \quad 0 \leq \left| \frac{xy}{\sqrt{x^2 + y^2}} \right| \leq y.$$

$$\lim_{y \rightarrow 0} 0 = 0 \quad \Rightarrow \quad \lim_{(x,y) \rightarrow (0,0)} \frac{xy}{\sqrt{x^2 + y^2}} = 0.$$

$$5. \quad y=0: \lim_{x \rightarrow 0} \frac{0}{x^4} = 0$$

$$y=x^2: \lim_{x \rightarrow 0} \frac{2x^4}{2x^4} = 1 \quad \Rightarrow \text{DNE}$$

$$6. \quad \frac{\partial f}{\partial x} = 2xy + y^2$$

$$\frac{\partial f}{\partial y} = x^2 + 2xy$$

$$7. \quad \frac{\partial f}{\partial x} = -\frac{y + \tan(y)}{e^x}$$

$$\frac{\partial f}{\partial y} = \frac{1 + \sec^2 y}{e^x}$$

$$8. \quad \frac{\partial f}{\partial x} = \frac{y}{xy} = \frac{1}{x}$$

$$\frac{\partial f}{\partial y} = \frac{x}{xy} = \frac{1}{y}$$

(why is this the same as $\frac{d}{dy} \ln(y)$?)

$$9. \quad \frac{\partial f}{\partial x} = -\sin(x) \sin(y)$$

$$\frac{\partial f}{\partial y} = \cos(x) \cos(y)$$

$$10. \quad \frac{\partial z}{\partial x} = \cos(xy) - x \cdot \sin(xy) \cdot y$$

$$\frac{\partial z}{\partial y} = x^2 \cos(xy)$$

$$11. \quad \frac{\partial z}{\partial x} = 2x\sqrt{x+y} + \frac{x^2}{2\sqrt{x+y}}$$

$$\frac{\partial z}{\partial y} = \frac{x^2}{2\sqrt{x+y}}$$

$$12. \quad \frac{\partial z}{\partial x} = 0$$

$$\frac{\partial z}{\partial y} = \cos(y^3) \cdot 3y^2$$

