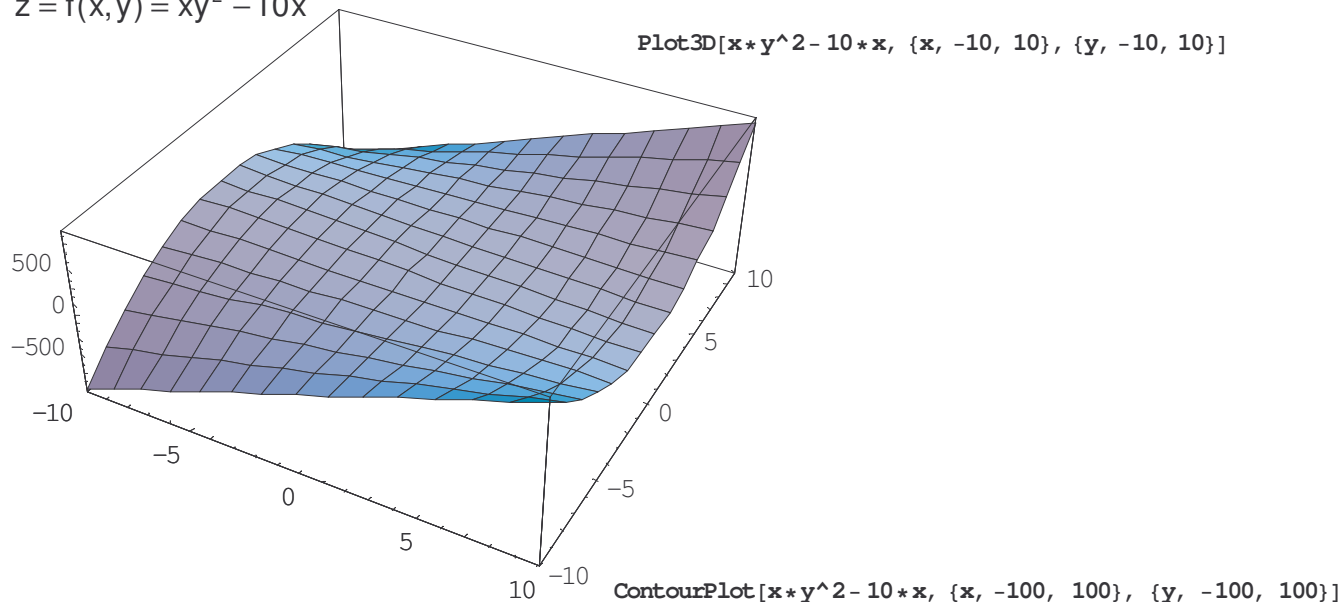


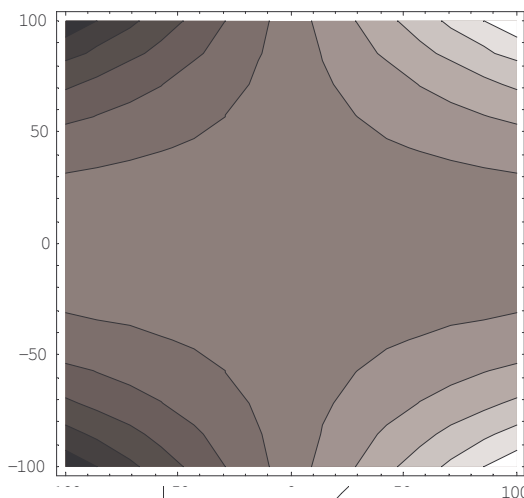
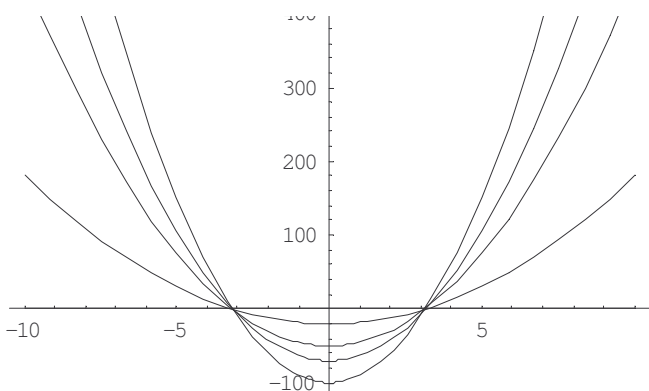
2. Gegeben sei die Polynomfunktion $z = f(x,y) = xy^2 - 10x$. Man bestimme die Gleichungen ihrer Schnittkurven mit den senkrechten Ebenen $x = x_0$ bzw. $y = y_0$ sowie die Höhenlinien für $z = z_0$ und skizziere alle drei Kurvenscharen. Mittels eines Computeralgebrasystems ermittle man eine 3D-Darstellung der gegebenen Funktion.

$$z = f(x,y) = xy^2 - 10x$$



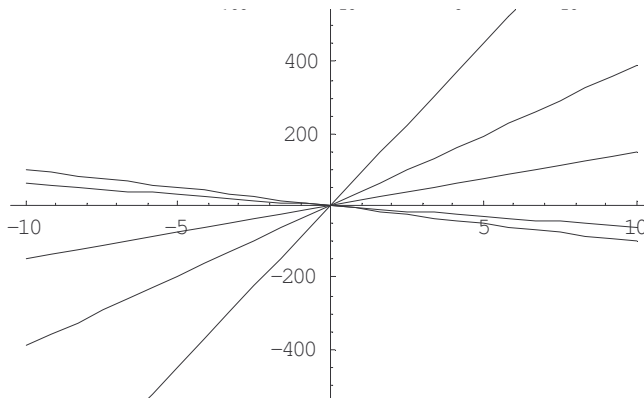
$$x = x_0 : z = x_0 y^2 - 10x_0 = x_0 (y^2 - 10)$$

```
Plot[{0*y^2 - 10*0, 10*y^2 - 10*10, 5*y^2 - 10*5,
      2*y^2 - 10*2, 7*y^2 - 10*7}, {y, -10, 10}];
```



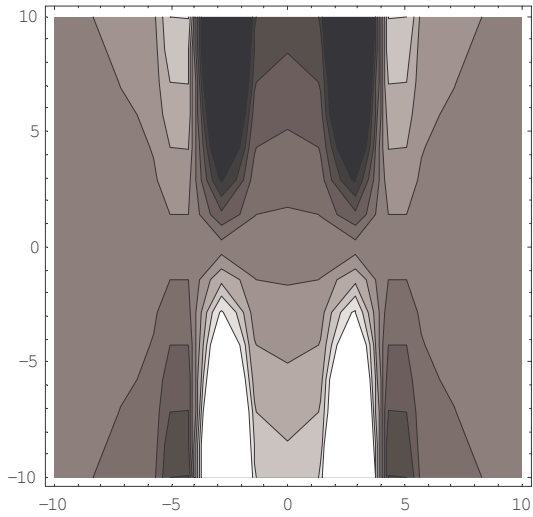
$$y = y_0 : z = xy_0^2 - 10x = x(y_0^2 - 10)$$

```
Plot[{x*10^2 - 10*x, x*0^2 - 10*x,
      x*5^2 - 10*x, x*2^2 - 10*x,
      x*7^2 - 10*x}, {x, -10, 10}];
```



$$z = z_0 : z_0 = xy^2 - 10x \rightarrow y^2 = \frac{z_0}{x} - 10 \rightarrow y = \pm \sqrt{\frac{z_0}{x} - 10}$$

```
ContourPlot[x/(y^2 - 10),
  {y, -10, 10}, {x, -10, 10}]
```



```
Plot[{1/(y^2 - 10), 10/(y^2 - 10), 5/(y^2 - 10), 7/(y^2 - 10),
  2/(y^2 - 10)}, {y, -10, 10}];
```

