```
In[1]:= SetOptions[Plot3D(*Or whichever plot you desire*),
          ColorFunction → "Rainbow"(*One of many options*)];
        SetOptions[RegionPlot(*Or whichever plot you desire*),
          ColorFunction → "BlueGreenYellow"(*One of many options*)];
```
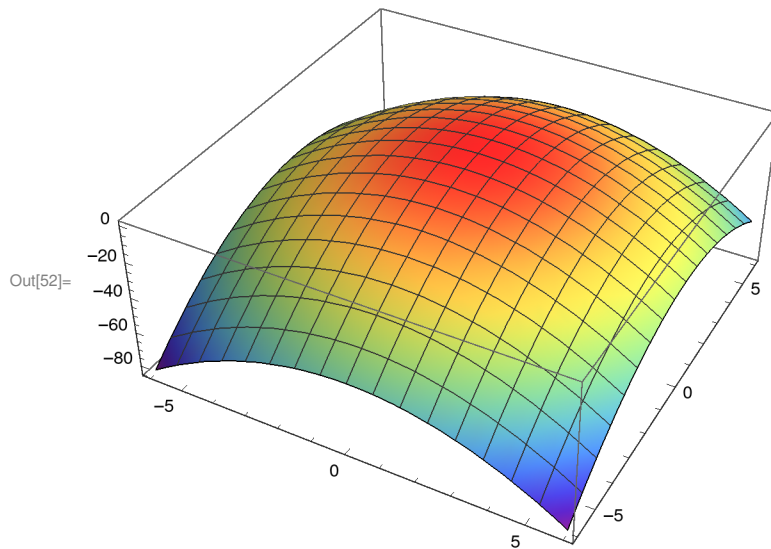
```
In[48]:= f = -x^2 - y^2 + 2 y
        a = {x, -6, 6}
        b = {y, -6, 6}
        v = x^2 + y^2 ≤ 16 && y > 0
        Plot3D[f, a, b]
        RegionPlot[v, a, b, AspectRatio → Automatic]
        Plot3D[{f}, a, b,
          RegionFunction → Function[{x, y, z}, v = x^2 + y^2 ≤ 16 && y > 0], BoxRatios → Automatic]
```
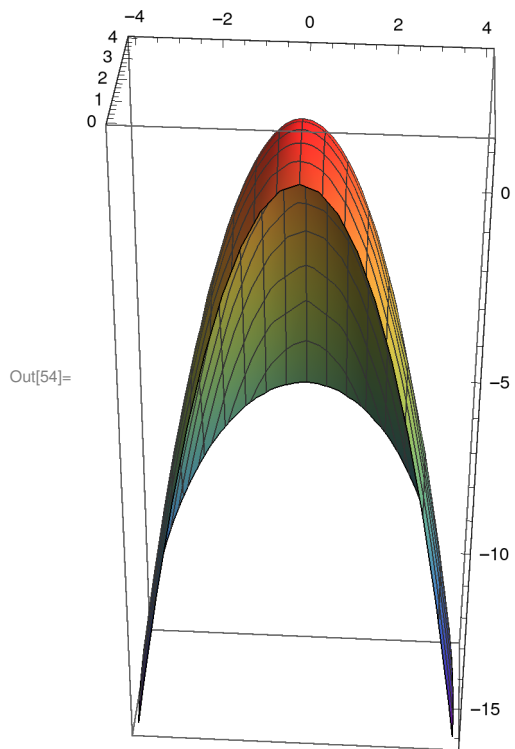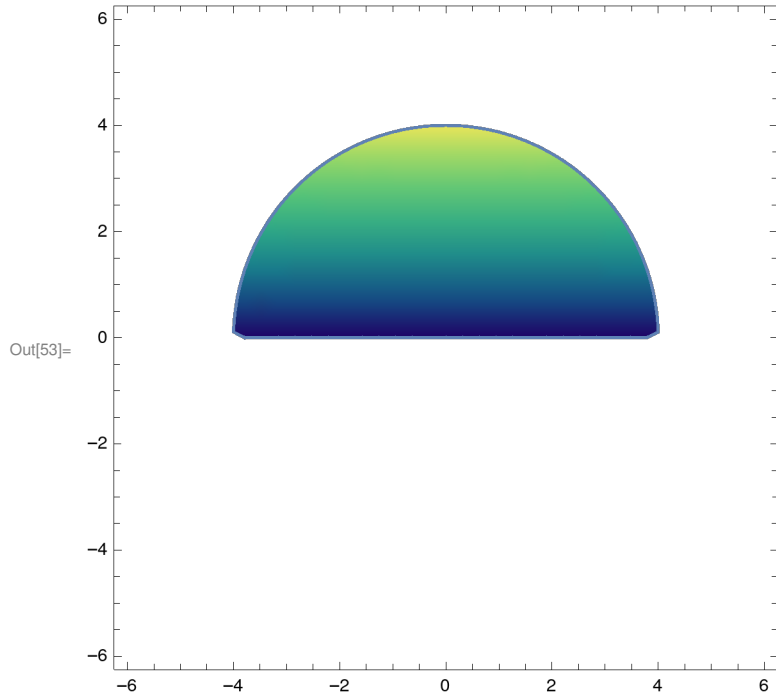
Out[48]= $-x^2 + 2 y - y^2$

Out[49]= {x, -6, 6}

Out[50]= {y, -6, 6}

Out[51]= $x^2 + y^2 \le 16$ && y > 0

Out[52]=

Out[53]=

Out[54]=

(*1*)

In[•]:= **f = x ^ 2 − x * y**

a = {x, −1, 4}

b = {y, −1, 4}

Plot3D[f, a, b, AspectRatio → Automatic]

RegionPlot[0 < x < 2 && 0 < y < 3, a, b, AspectRatio → Automatic]

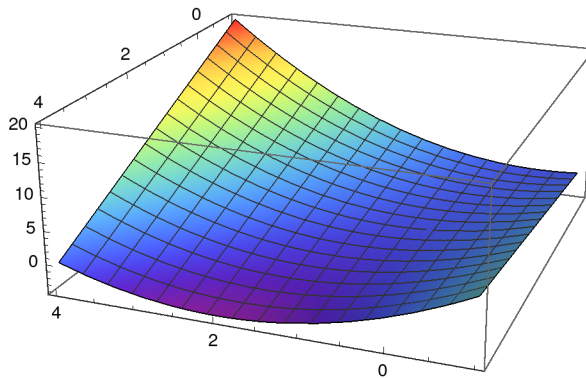**Plot3D[{f}, {x, 0, 1}, {y, 0, 1}, RegionFunction → Function[{x, y, z}, 0 < x < 2 && 0 < y < 3]]**

Out[•]= $x^2 - x\,y$

Out[•]= {x, −1, 4}

Out[•]= {y, −1, 4}

Out[•]=

Out[•]=
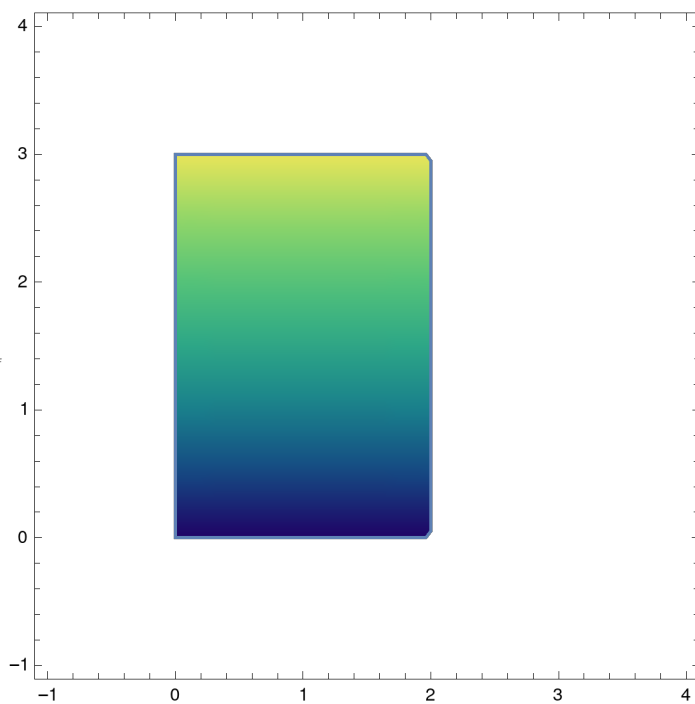
Out[•]=
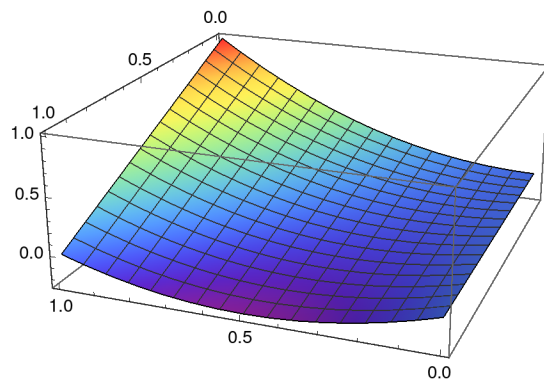
In[•]:= **f = 4 x^2 + 10 y^2**

a = {x, -2, 2}

b = {y, -2, 2}

Plot3D[f, a, b]

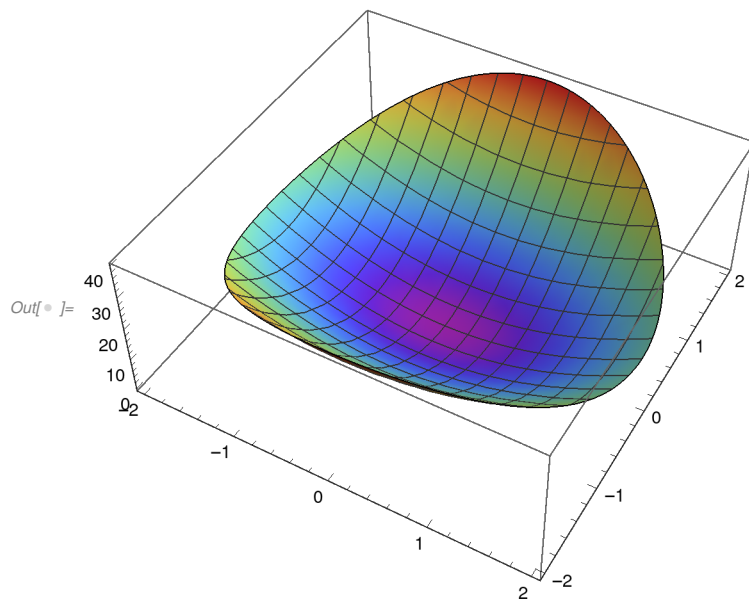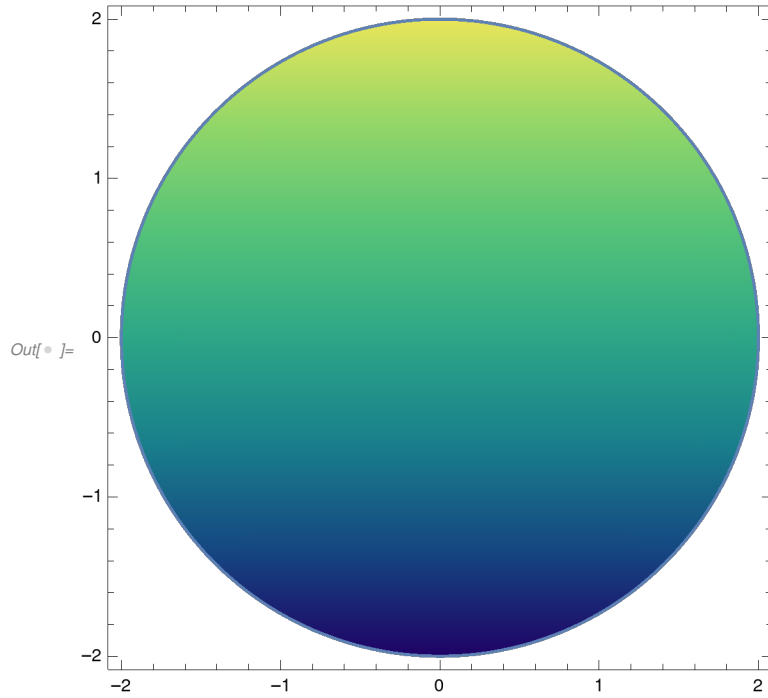**RegionPlot[x^2 + y^2 < 4, a, b, AspectRatio → Automatic]**

Plot3D[{f}, a, b, RegionFunction → Function[{x, y, z}, x^2 + y^2 < 4]]

Out[•]= $4 x^2 + 10 y^2$
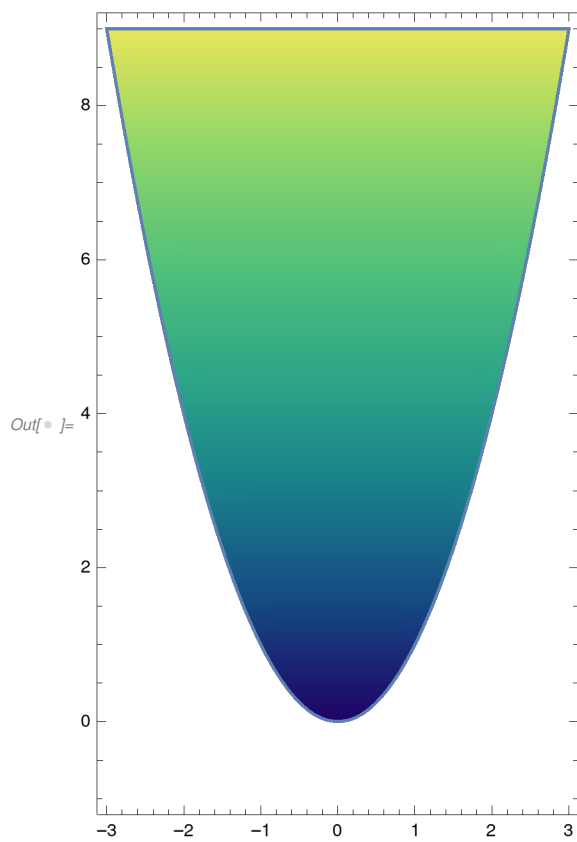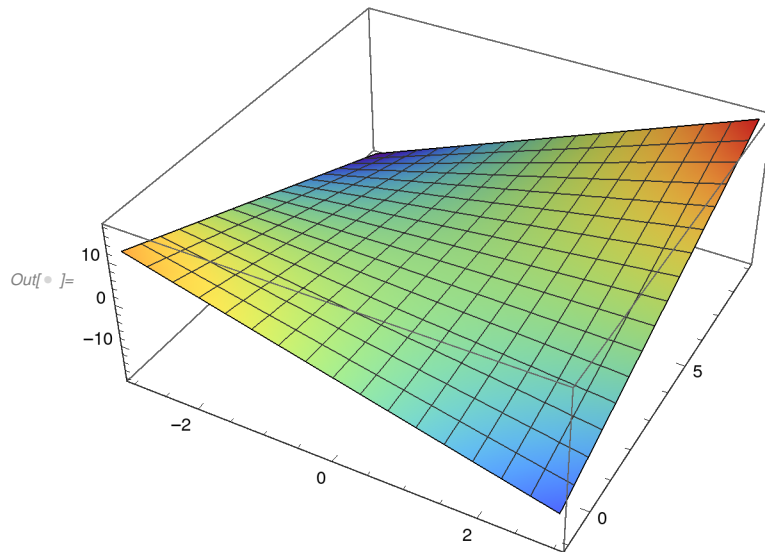
Out[•]= {x, -2, 2}

Out[•]= {y, -2, 2}

Out[•]=

Out[•]=

Out[•]=
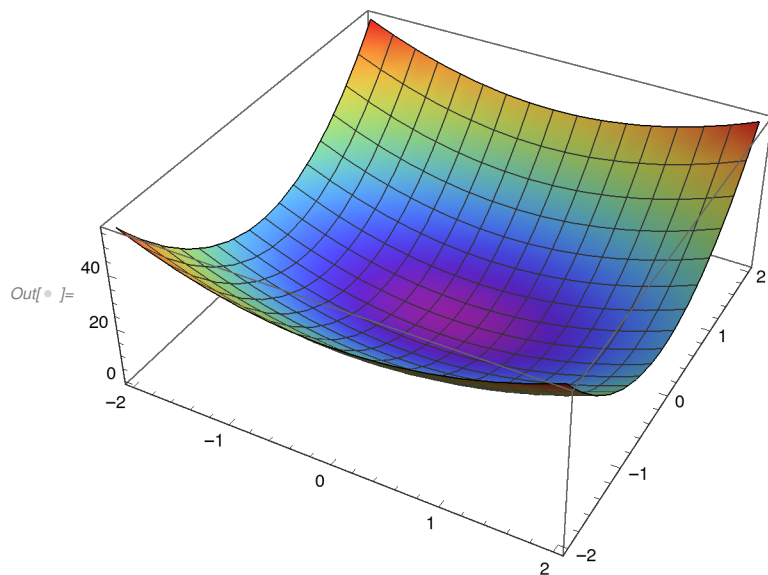
In[•]:= `f = x * y - 3 x`
`a = {x, -3, 3}`
`b = {y, -1, 9}`
`Plot3D[f, a, b]`
`RegionPlot[x^2 < y < 9, a, b, AspectRatio → Automatic]`
`Plot3D[{f}, a, b, RegionFunction → Function[{x, y, z}, x^2 < y < 9]]`

Out[•]= `-3 x + x y`

Out[•]= {x, -3, 3}

Out[•]= {y, -1, 9}

Out[•]=

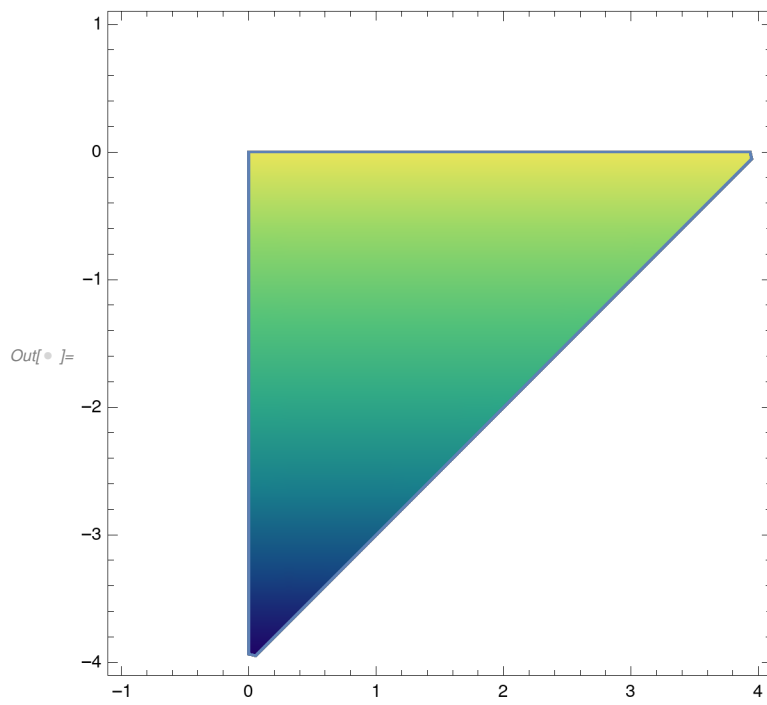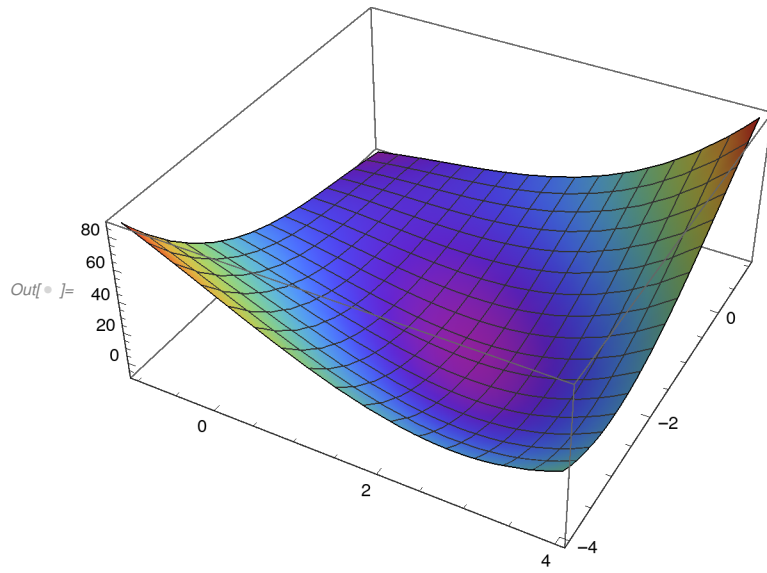*Out[•]=*
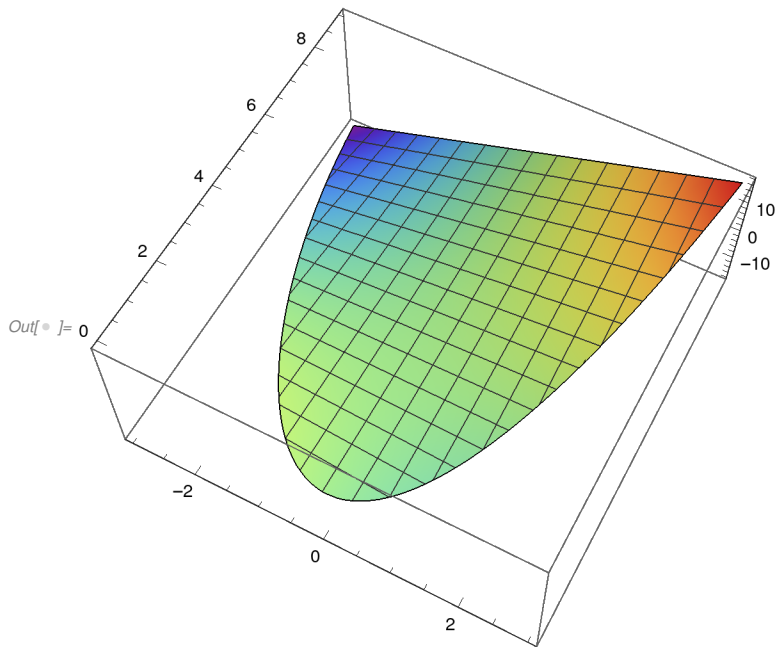
```
In[•]:= f = x^3 + 6 x * y − y^3
      a = {x, −1, 4}
      b = {y, −4, 1}
      Plot3D[f, a, b]
      RegionPlot[{0 < x < 4 && 0 > y > −4 && y > x − 4}, a, b, AspectRatio → Automatic]
      Plot3D[{f}, a, b, RegionFunction → Function[{x, y, z}, 0 < x < 4 && 0 > y > −4 && y > x − 4]]
```
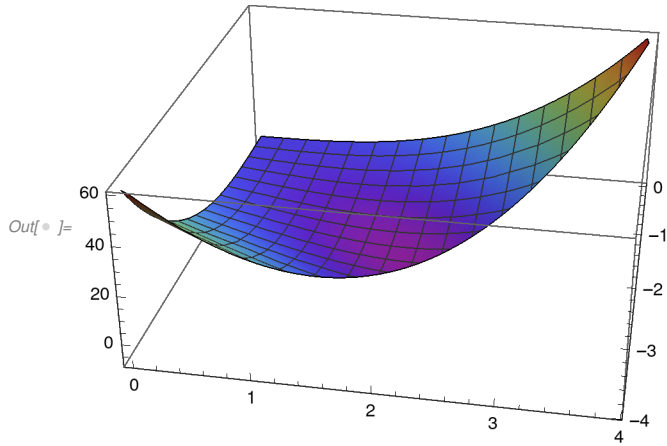
Out[•]= $x^3 + 6 x y − y^3$

Out[•]= {x, −1, 4}

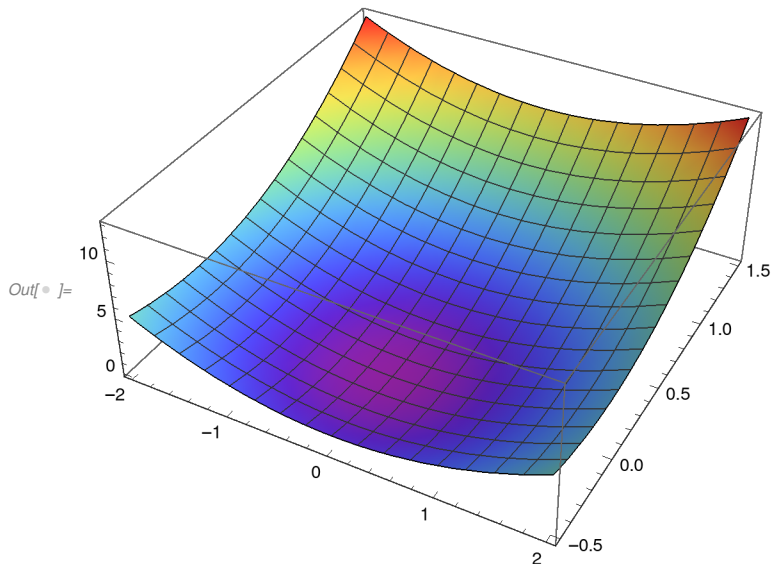Out[•]= {y, −4, 1}

Out[•]=

Out[•]=

Out[•]=

In[•]:= `f = x ^ 2 + 4 y ^ 2`

`a = {x, -2, 2}`

`b = {y, -0.5, 1.5}`

`Plot3D[f, a, b]`

`RegionPlot[{x ^ 2 + (y + 1) ^ 2 < 4 && 0 < y < x + 1}, a, b, AspectRatio → Automatic]`

`Plot3D[{f}, a, b, RegionFunction → Function[{x, y, z}, x ^ 2 + (y + 1) ^ 2 < 4 && 0 < y < x + 1]]`

Out[•]= $x^2 + 4 y^2$

Out[•]= $\{x, -2, 2\}$

Out[•]= $\{y, -0.5, 1.5\}$

Out[•]=

Out[•]=

Out[•]=
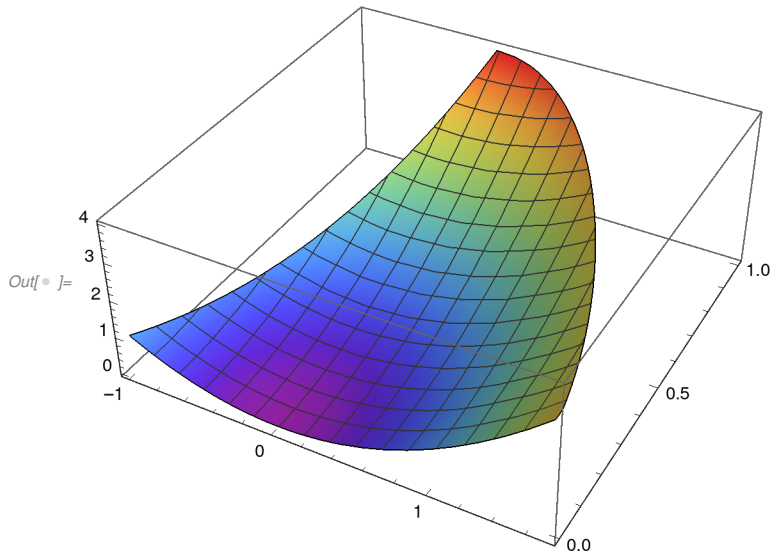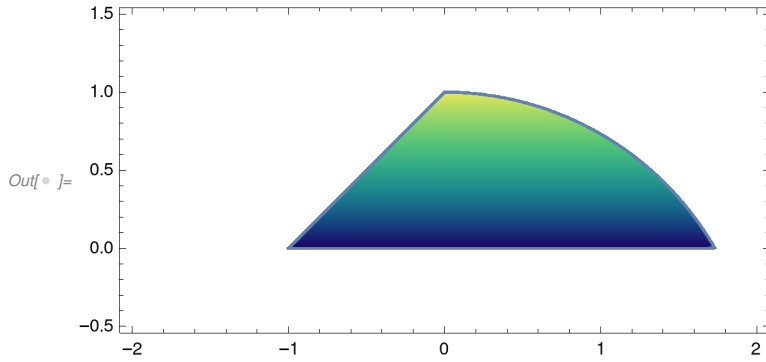
In[•]:= **f = 4 x ^ 2 + y ^ 2 − 4 x * y**

a = {x , −2, 2}

b = {y , −1, 4}

Plot3D[f , a, b]

RegionPlot[x ^ 2 < y < 4, a, b, AspectRatio → Automatic]

Plot3D[{f}, a, b, RegionFunction → Function[{x, y, z}, x ^ 2 < y < 4]]

Out[•]= $4 x^2 − 4 x y + y^2$

Out[•]= {x, −2, 2}

Out[•]= {y, −1, 4}

Out[•]=

Out[•]=
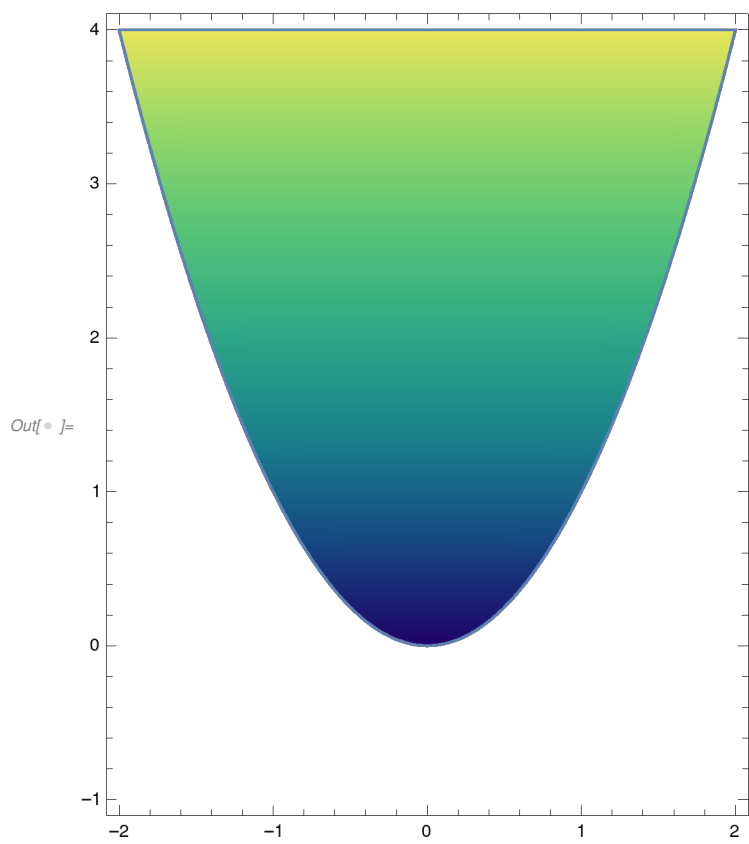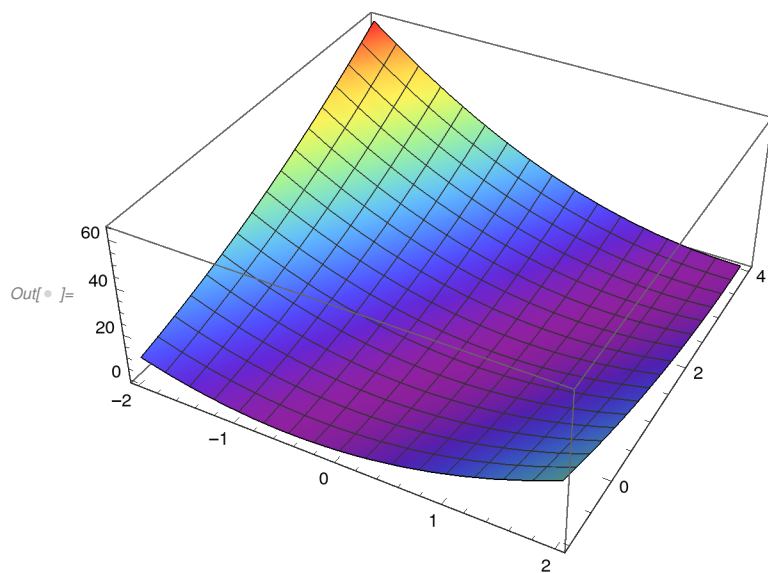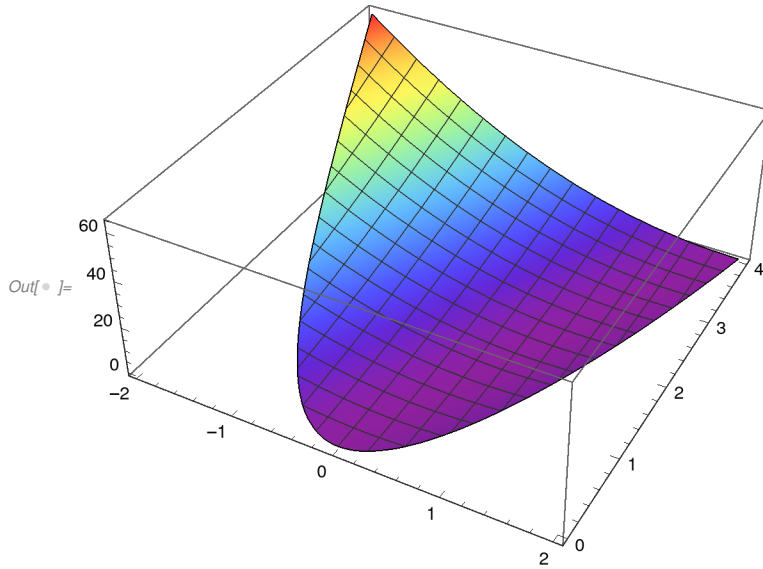
In[•]:= **f = 2 x ^ 2 + y − 3 x * y**

a = {x , −1, 1}

b = {y , −1, 1}

Plot3D[f , a, b]

RegionPlot[y < 1 − x && y < 1 + x && y > −1 − x && y > x − 1, a, b, AspectRatio → Automatic]

Plot3D[{f}, a, b,

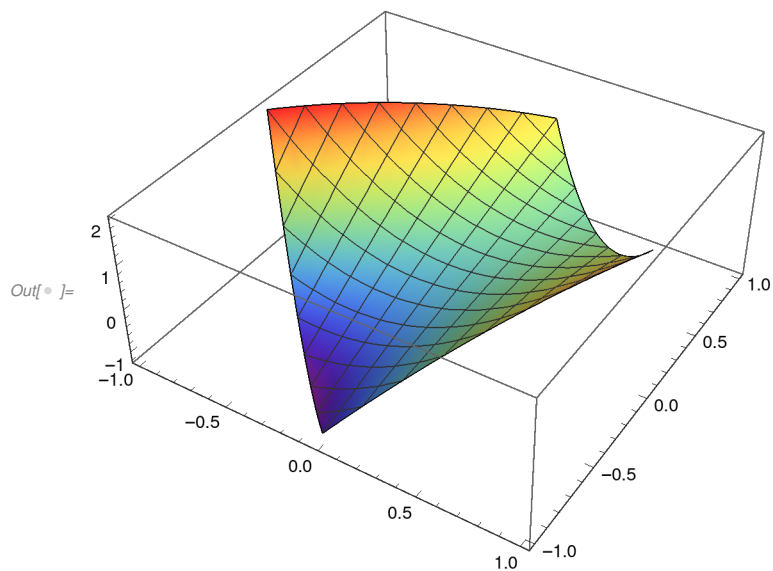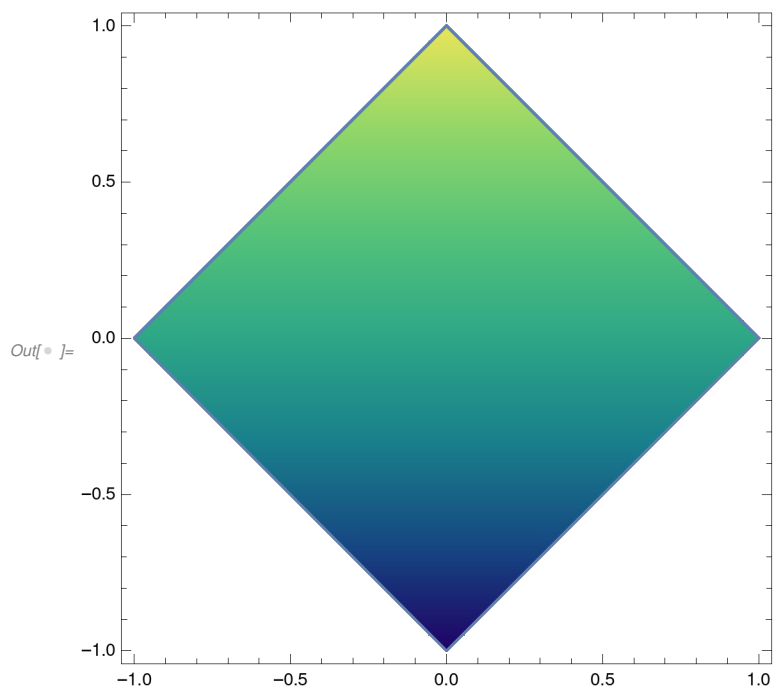 **RegionFunction → Function[{x, y, z}, y < 1 − x && y < 1 + x && y > −1 − x && y > x − 1]]**

Out[•]= $2 x^2 + y − 3 x y$

Out[•]= {x , −1, 1}

Out[•]= {y , −1, 1}
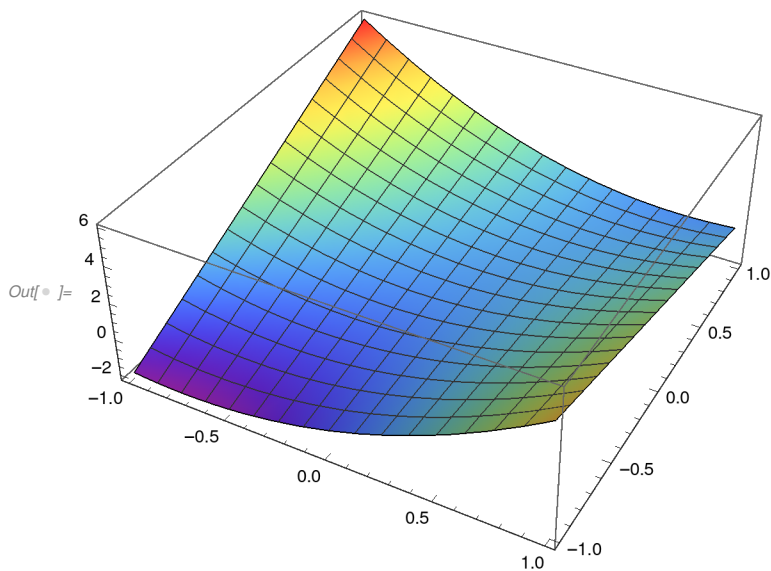
In[•]:= **f = x ^ 2 − 8 x + y ^ 2 + 7**

a = {x , −1 , 1}

b = {y , 0 , 1}

Plot3D[f , a , b]

RegionPlot[x ^ 2 + y ^ 2 < 1 && y > 0, a , b , AspectRatio → Automatic]

Plot3D[{f}, a , b , RegionFunction → Function[{x, y, z}, x ^ 2 + y ^ 2 < 1 && y > 0]]

Out[•]= $7 - 8x + x^2 + y^2$

Out[○]= {x, -1, 1}

Out[○]= {y, 0, 1}

Out[○]=

Out[○]=

Out[○]=