

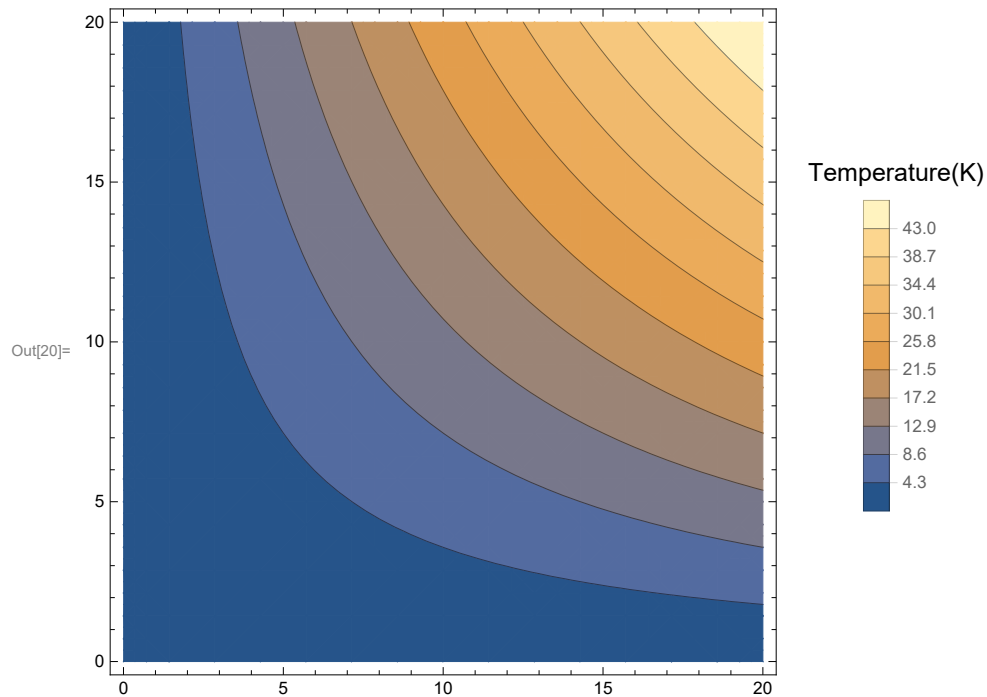
■ $(p + a/v^2)(v - b) = RT$ - Van der waals gas

In[48]:= **R = 8.31;**

$$T[p_, v_, a_, b_] := \frac{(p + a/v^2)(v - b)}{R}$$

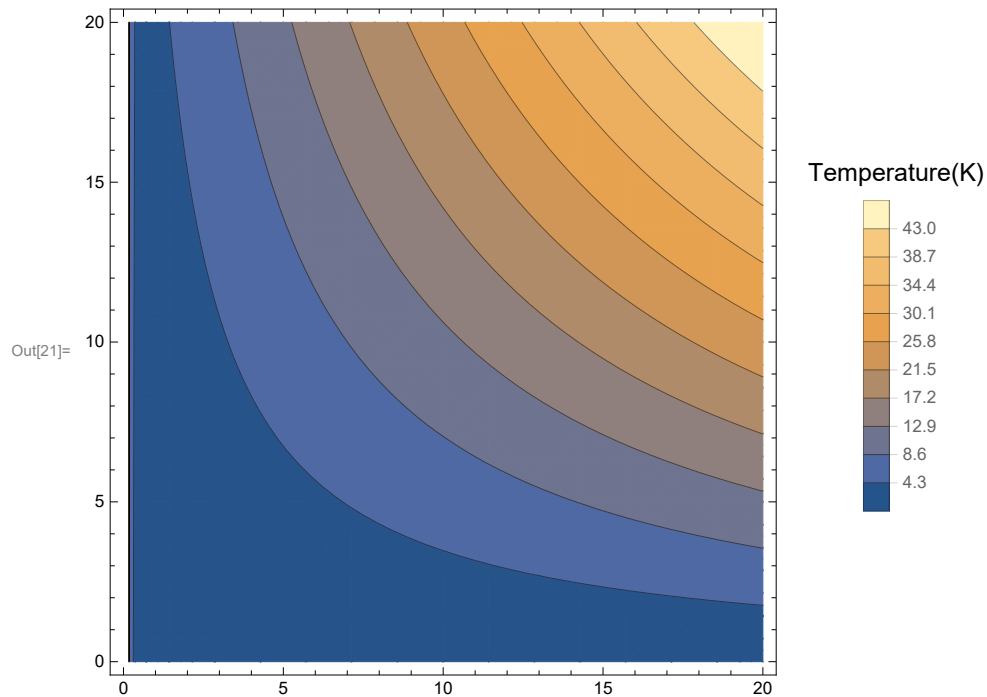
■ Ideal gas (x axis->v, y axis ->p)

In[20]:= **ContourPlot[T[p, v, 0, 0], {v, 0, 20}, {p, 0, 20}, Contours -> 10,
PlotLegends -> BarLegend[Automatic, LegendMarkerSize -> 180,
LegendFunction -> "Frame", LegendMargins -> 5, LegendLabel -> "Temperature (K)"]]**

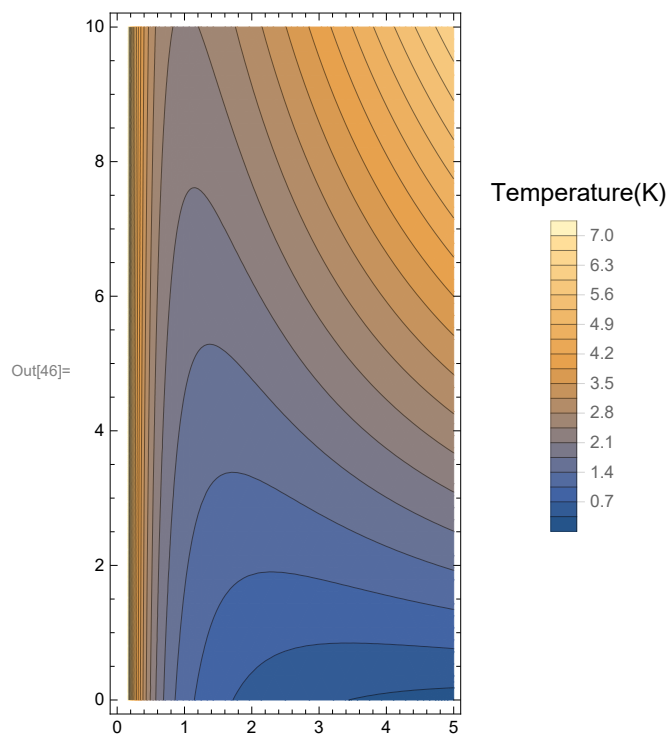


■ high molecular interaction & low repulsive force

```
In[21]:= ContourPlot[T[p, v, 10, 0], {v, 0, 20}, {p, 0, 20}, Contours → 10,
PlotLegends → BarLegend[Automatic, LegendMarkerSize → 180,
LegendFunction → "Frame", LegendMargins → 5, LegendLabel → "Temperature (K)"]]
```

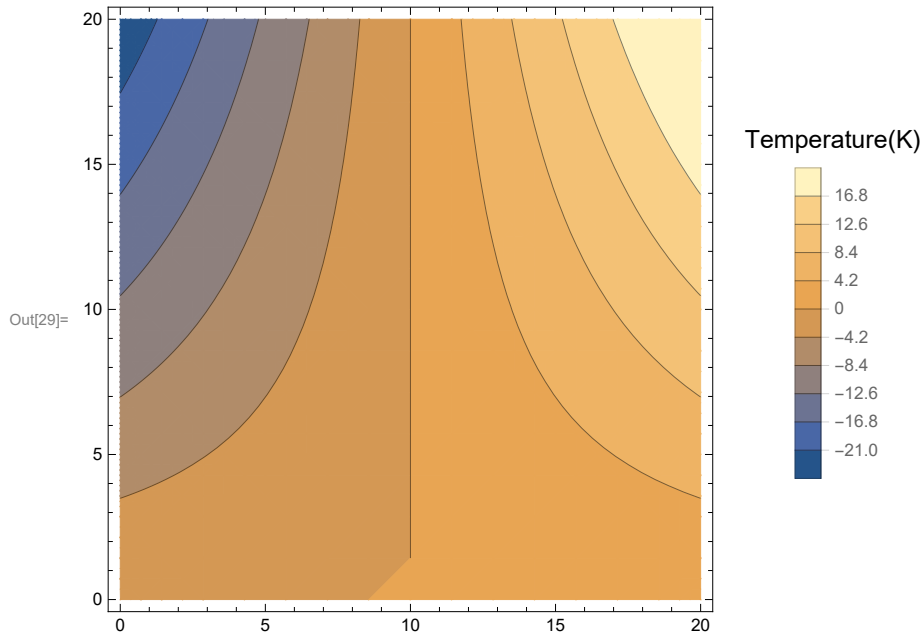


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In[46]:= ContourPlot[T[p, v, 10, 0], {v, 0, 5}, {p, 0, 10}, Contours → 20,
AspectRatio → Automatic, PlotLegends → BarLegend[Automatic, LegendMarkerSize → 180,
LegendFunction → "Frame", LegendMargins → 5, LegendLabel → "Temperature (K)"]]
```



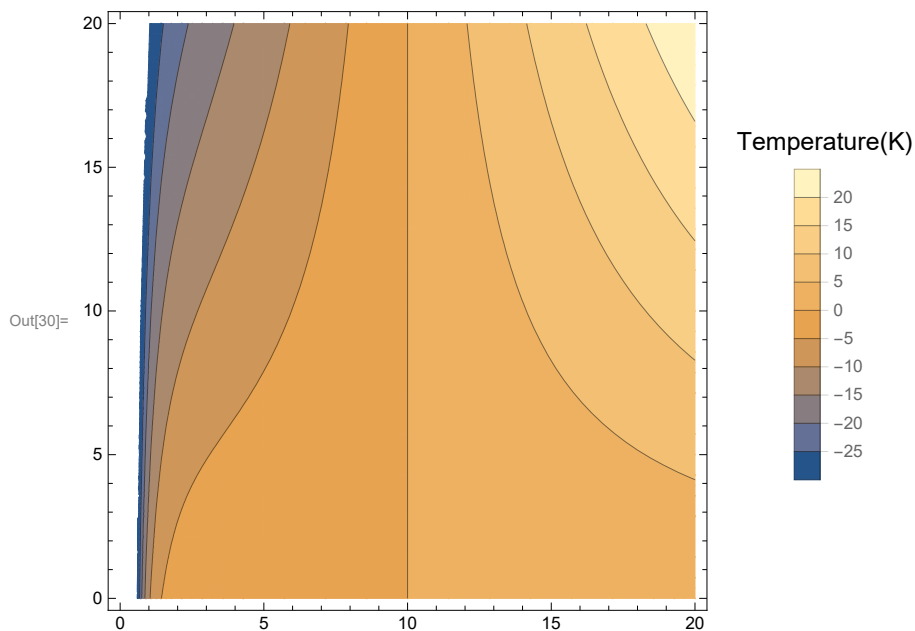
- low interaction & high repulsive force

```
In[29]:= ContourPlot[T[p, v, 0, 10], {v, 0, 20}, {p, 0, 20}, Contours → 10,
PlotLegends → BarLegend[Automatic, LegendMarkerSize → 180,
LegendFunction → "Frame", LegendMargins → 5, LegendLabel → "Temperature (K) "]]
```



■ High interaction & high repulsive force

```
In[30]:= ContourPlot[T[p, v, 10, 10], {v, 0, 20}, {p, 0, 20}, Contours → 10,
PlotLegends → BarLegend[Automatic, LegendMarkerSize → 180,
LegendFunction → "Frame", LegendMargins → 5, LegendLabel → "Temperature (K) "]]
```

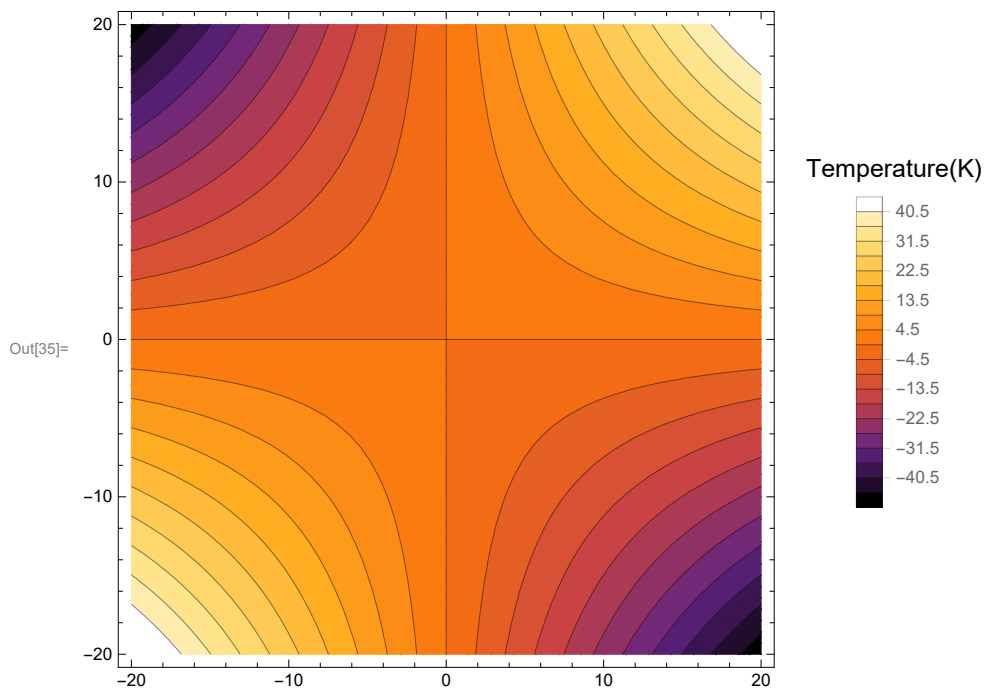


■ ETC..

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In[35]:= ContourPlot[T[p, v, 0, 0], {v, -20, 20}, {p, -20, 20},
  Contours → 20, ColorFunction → ColorData["SunsetColors"],
  PlotLegends → BarLegend[Automatic, LegendMarkerSize → 180,
    LegendFunction → "Frame", LegendMargins → 5, LegendLabel → "Temperature (K)"]]

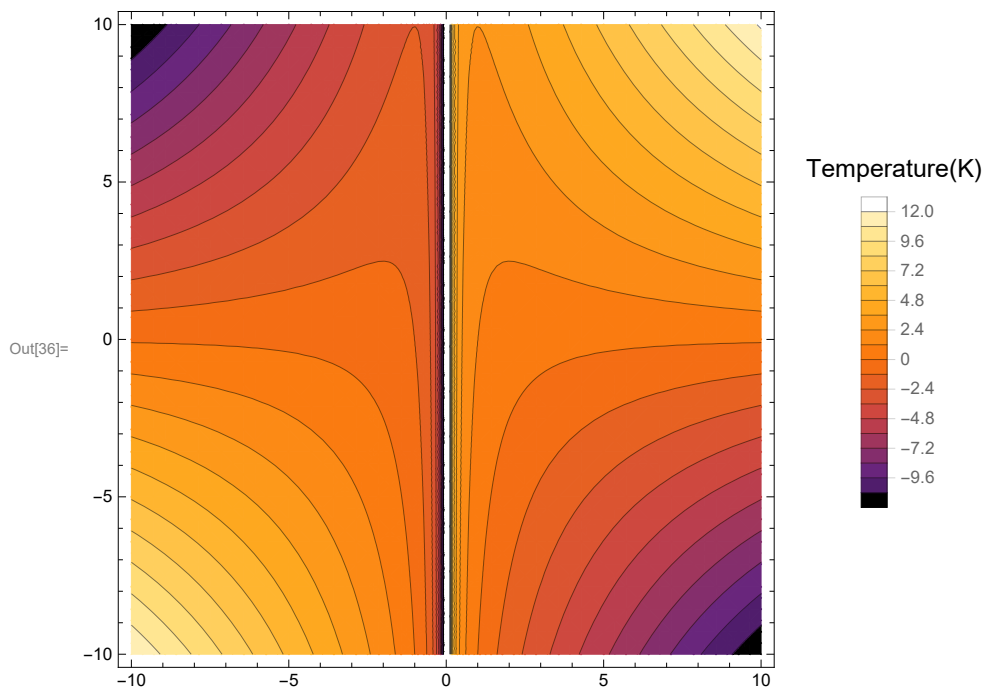
```



```

In[36]:= ContourPlot[T[p, v, 10, 0], {v, -10, 10}, {p, -10, 10},
  Contours → 20, ColorFunction → ColorData["SunsetColors"],
  PlotLegends → BarLegend[Automatic, LegendMarkerSize → 180,
    LegendFunction → "Frame", LegendMargins → 5, LegendLabel → "Temperature (K)"]]

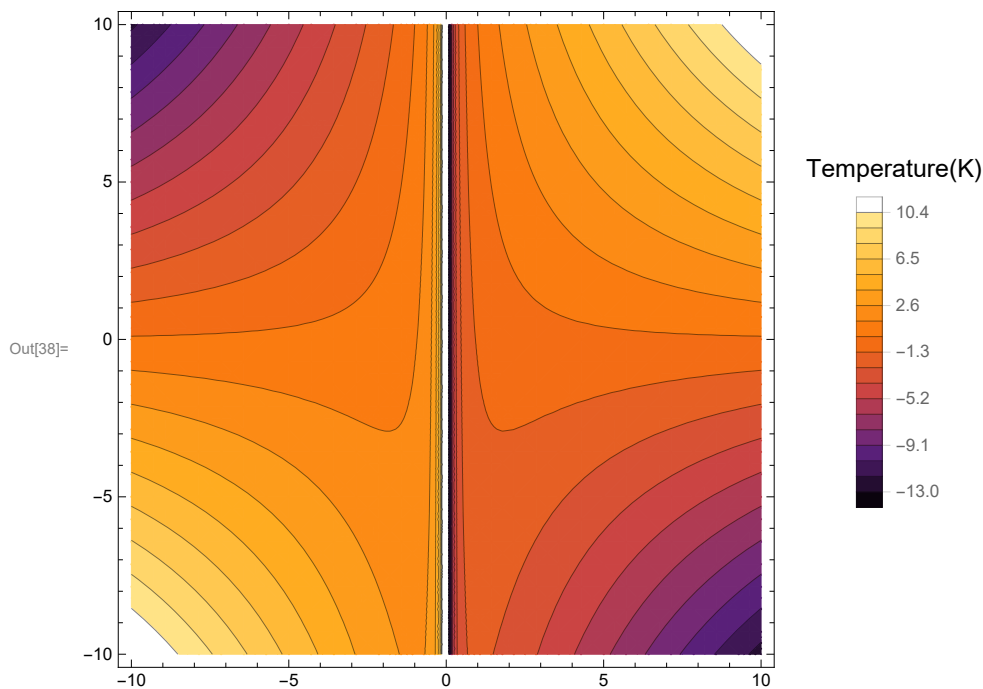
```



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In[38]:= ContourPlot[T[p, v, -10, 0], {v, -10, 10}, {p, -10, 10},
  Contours → 20, ColorFunction → ColorData["SunsetColors"],
  PlotLegends → BarLegend[Automatic, LegendMarkerSize → 180,
    LegendFunction → "Frame", LegendMargins → 5, LegendLabel → "Temperature (K)"]]

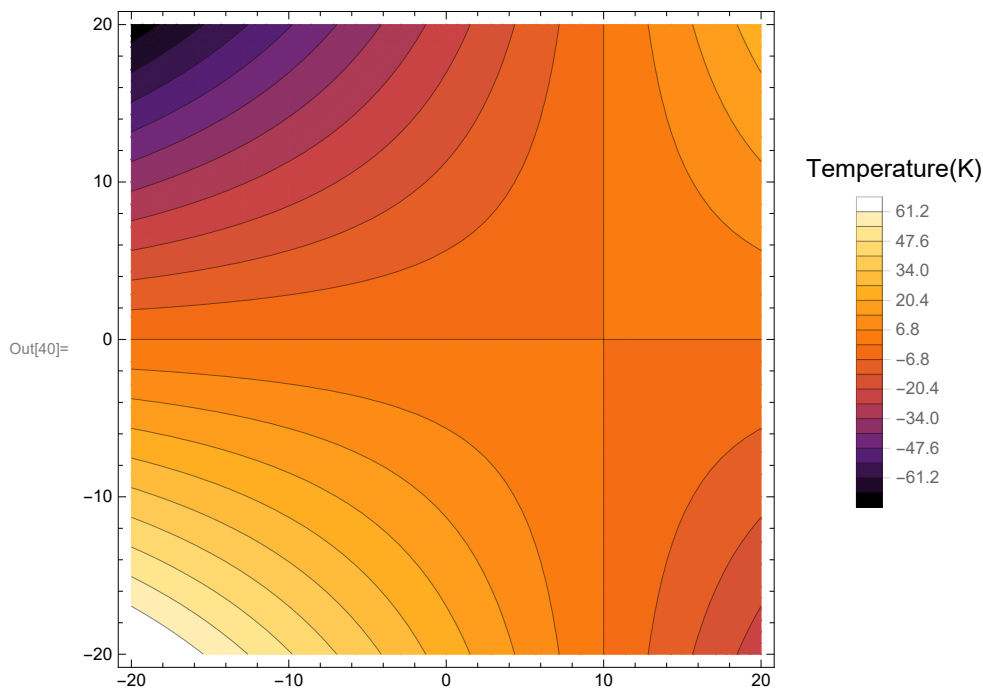
```



```

In[40]:= ContourPlot[T[p, v, 0, 10], {v, -20, 20}, {p, -20, 20},
  Contours → 20, ColorFunction → ColorData["SunsetColors"],
  PlotLegends → BarLegend[Automatic, LegendMarkerSize → 180,
    LegendFunction → "Frame", LegendMargins → 5, LegendLabel → "Temperature (K)"]]

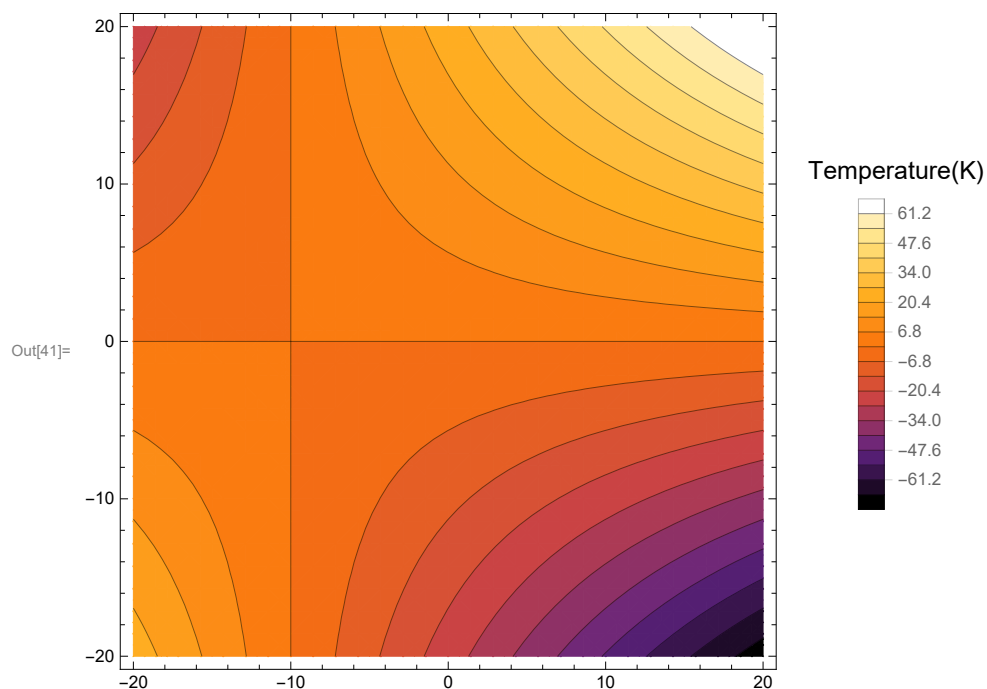
```



```

In[41]:= ContourPlot[T[p, v, 0, -10], {v, -20, 20}, {p, -20, 20},
  Contours → 20, ColorFunction → ColorData["SunsetColors"],
  PlotLegends → BarLegend[Automatic, LegendMarkerSize → 180,
    LegendFunction → "Frame", LegendMargins → 5, LegendLabel → "Temperature (K)"]]

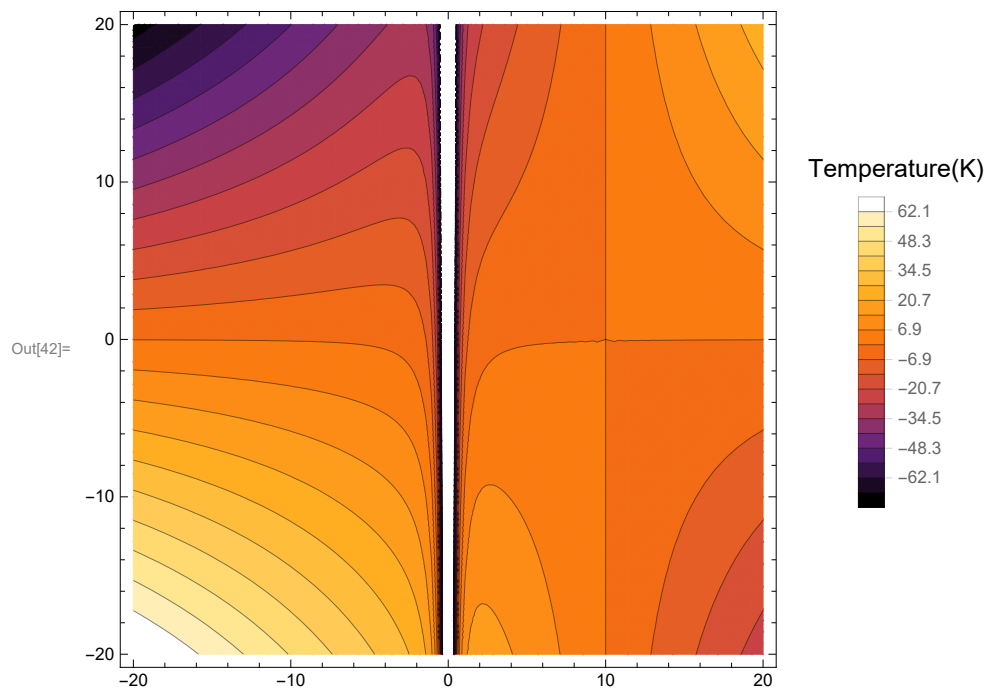
```



```

In[42]:= ContourPlot[T[p, v, 10, 10], {v, -20, 20}, {p, -20, 20},
  Contours → 20, ColorFunction → ColorData["SunsetColors"],
  PlotLegends → BarLegend[Automatic, LegendMarkerSize → 180,
    LegendFunction → "Frame", LegendMargins → 5, LegendLabel → "Temperature (K)"]]

```



```

In[43]:= ContourPlot[T[p, v, -10, -10], {v, -20, 20}, {p, -20, 20},
  Contours → 20, ColorFunction → ColorData["SunsetColors"],
  PlotLegends → BarLegend[Automatic, LegendMarkerSize → 180,
    LegendFunction → "Frame", LegendMargins → 5, LegendLabel → "Temperature (K)"]]

```

