Letting Mathematica do the work in Problem Set 7, Problem 1

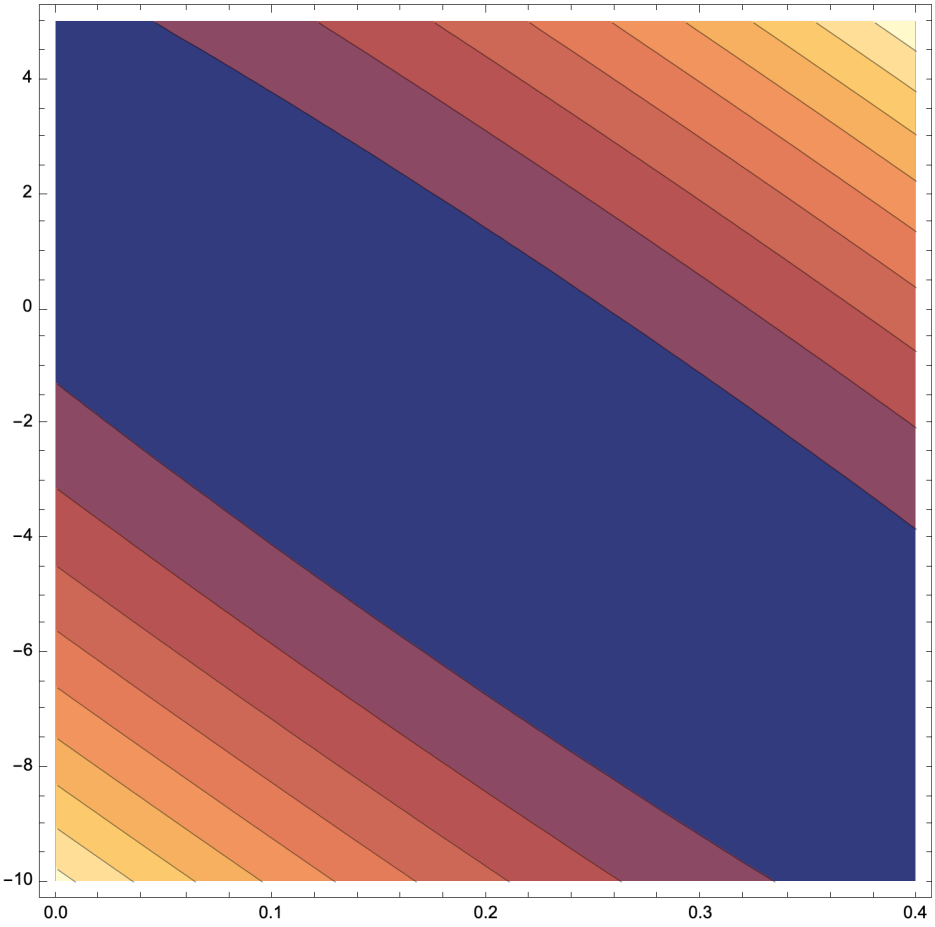
The quadratic function we are minimizing.

In[69]:=
```
f[a_, b_] := (0 - (15 * a + b))^2 + (2.5 - (25 * a + b))^2 + (4.5 - (35 * a + b))^2
```

A visualization of the function. On the horizontal axis is *b*. On the vertical axis is *a*. The colors tell you how high the quadratic function is. Dark colors are low. Orangy colors are high.

In[70]:=
```
ContourPlot[f[a, b], {a, 0.0, 0.4}, {b, -10, 5}]
```

Out[70]=



It is a little hard to see where the minimum is just by eye-balling it, but Mathematica can find it in one line.

In[71]:=
```
Minimize[f[a, b], {a, b}]
```

Out[71]=

```
{0.0416667, {a → 0.225, b → -3.29167}}
```

Plot the three data points.

In[72]:=
```
plot1 =
  ListPlot[{{15, 59}, {25, 61.5}, {35, 63.5}}, PlotRange → {{0, 45}, {55, 66}}];
```

The best fit has $a = 0.225$, and $b = -3.29$, but now I will add the 59 back in, and then $b = 55.71$.

In[73]:=
```
plot2 = Plot[0.225 * t + 55.71, {t, 0, 60}, PlotRange → {{0, 45}, {55, 66}}];
```

Now that we have plotted the data and the best fit, we display them on top of each other:

In[74]:=
```
Show[plot1, plot2]
```

Out[74]=