Worksheet to support Exercise 3.4.9, modeling a cooling potato.

> *restart*;
  with(*plots*) :

The data, in time/temperature pairs:

> *data* := [[0, 204], [2, 193], [4, 184], [8, 169], [10, 162], [13, 156], [17, 149], [20, 143],
       [24, 138], [30, 130]] :

Number of data points is

> $N := nops(data)$

A plot

> *plt1* := *pointplot*(*data*, *color* = *red*, *symbol* = *solidcircle*, *symbolsize* = 20, *labels*
       = ["time (minutes)", "Temperature"], *labeldirections* = [*horizontal*, *vertical*]) :
  display(*plt1*);

The temperature might be modeled by the function

> $u(t) := 72 + 132 \cdot \exp(-k \cdot t)$

A least-squares function can be formed as

> $SS := add\left((u(data[j][1]) - data[j][2])^2, j = 1..N\right)$

Now adjust k to minimize this.

>