Problem of the Week  
Problem E  
How Small Can It Get?

A computer program takes in two inputs, Input\(A\) and Input\(B\), and produces one Final Output\(Y\) as follows.

Input\(A\) is doubled, then the result is squared. This result is then reduced by 4 times Input\(A\). The result is Output\(A\).

Input\(B\) is squared, then the result is increased by 6 times Input\(B\). The result is Output\(B\).

The program produces a Final Output\(Y = \text{Output}A + \text{Output}B\).

For example, if Input\(A\) is 5, then Output\(A\) is 80:

\[
\begin{align*}
\text{Input}A & \rightarrow \text{double} \rightarrow \text{square} \rightarrow \text{reduce by } 4 \times (\text{original input}) \rightarrow \text{Output}A \\
5 & \rightarrow 10 \rightarrow 100 \rightarrow 100 - 4(5) = 80 \rightarrow 80
\end{align*}
\]

If Input\(B\) is 8, then Output\(B\) is 112:

\[
\begin{align*}
\text{Input}B & \rightarrow \text{square} \rightarrow \text{increase by } 6 \times (\text{original input}) \rightarrow \text{Output}B \\
8 & \rightarrow 64 \rightarrow 64 + 6(8) = 112 \rightarrow 112
\end{align*}
\]

So if Input\(A\) is 5 and Input\(B\) is 8, the computer program will output Final Output\(Y = \text{Output}A + \text{Output}B = 80 + 112 = 192\).

Determine the minimum final output and the two input values which produce this minimum.