$V = lwh \quad \Rightarrow \quad 10 = (2w)(w)h = 2w^2h$, so $h = 5/w^2$.
The cost is $10(2w^2) + 6[2(2wh) + 2(hw)] = 20w^2 + 36wh$, so
$C(w) = 20w^2 + 36w(5/w^2) = 20w^2 + 180/w$.
$C'(w) = 40w - 180/w^2 = 40(w^3 - \frac{9}{2})/w^2 \quad \Rightarrow \quad w = \sqrt[3]{\frac{9}{2}}$ is the critical number. There is an absolute minimum for C when $w = \sqrt[3]{\frac{9}{2}}$ since $C'(w) < 0$ for $0 < w < \sqrt[3]{\frac{9}{2}}$ and $C'(w) > 0$ for $w > \sqrt[3]{\frac{9}{2}}$.
$C\left(\sqrt[3]{\frac{9}{2}}\right) = 20\left(\sqrt[3]{\frac{9}{2}}\right)^2 + \dfrac{180}{\sqrt[3]{9/2}} \approx$ \$163.54.