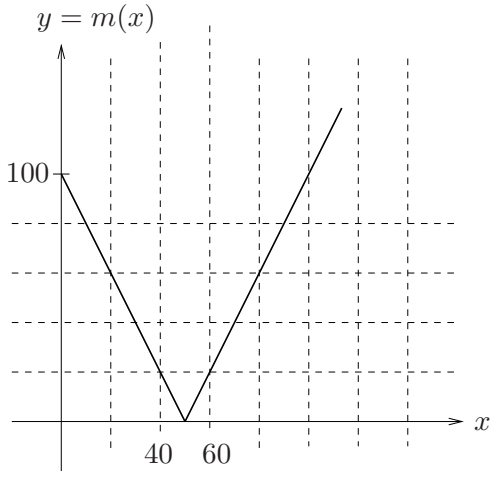
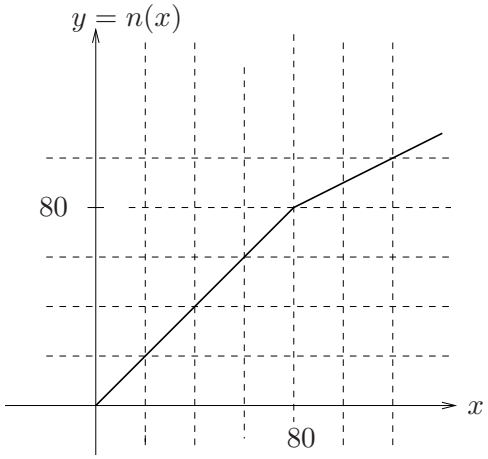
3. (6 points each) Consider the graphs of $m(x)$ and $n(x)$ below. Let $h(x) = n(m(x))$. Find the following, or explain why they do not exist. The function m has a sharp corner at $x = 50$ and n has a sharp corner at $x = 80$. Determine values that exist as *exact* values–*i.e.*, not a graphical approximation. Please circle your answers.





(a) $h'(80)$

$$\begin{aligned} h(x) &= n(m(x)) \\ \Rightarrow h'(x) &= n'(m(x))m'(x) \\ \Rightarrow h'(80) &= n'(m(80))m'(80) \\ &= n'(60)(2) \\ &= 2 \end{aligned}$$

(b) a value of x such that $h'(x) = -2$

$$h'(x) = n'(m(x))m'(x)$$

We have $m'(x) = -2$ for $0 < x < 50$ and $n'(x) = 1$ for $0 \leq x \leq 80$.

Thus we need $x = a$ such that $m'(a) = -2$ *and* $0 \leq m(a) \leq 80$.

Note that any a such that $10 < a < 50$ works.