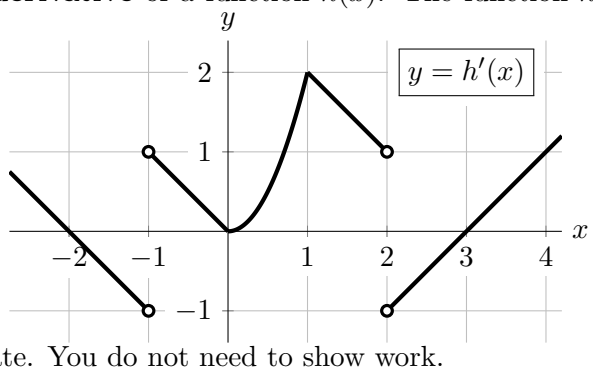
3. [14 points] A table of values for a differentiable, invertible function $g(x)$ and its derivative $g'(x)$ are shown below to the left. (This is the same table as in the previous problem.) Below to the right is shown a portion of the graph of $h'(x)$, the **derivative** of a function $h(x)$. The function $h(x)$ is defined and continuous for all real numbers.

x	0	1	2	3	4	5
$g(x)$	0	0.5	1	2	5	6
$g'(x)$	1.9	1.5	2.8	2.5	2.6	3



Answer parts **a.**–**c.**, or write NONE if appropriate. You do not need to show work.

a. [2 points] List the x-coordinates of all critical points of $h(x)$ on the interval $(-2, 4)$.

b. [2 points] List the x-coordinates of all critical points of $h'(x)$ on the interval $(-2, 4)$.

c. [2 points] List the x-coordinates of all local minima of $h(x)$ on the interval $(-2, 4)$.

d. [8 points] A curve is described implictly by the equation

$$yg(x) = e^{h(x)}.$$

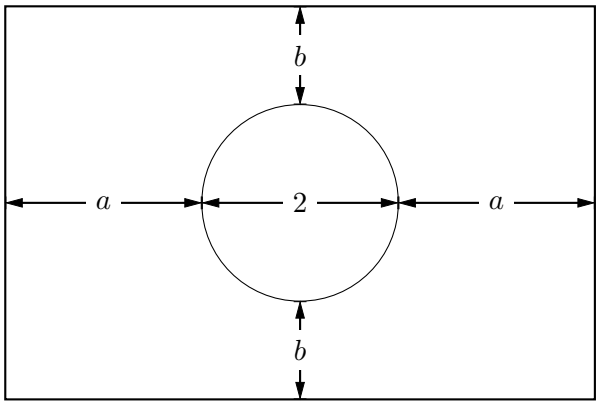
Assume $h(1) = 0$. Then the point $(1, 2)$ lies on this curve.

i. Find $\dfrac{dy}{dx}$ at the point $(1, 2)$. You must show every step of your work.

ii. Write an equation for the tangent line to the curve at the point $(1, 2)$.

4. [10 points] A landscaper is designing a rectangular garden surrounding a circular fountain in the middle.

- The diameter of the fountain is 2 meters.
- The distance from the fountain to the eastern and western edges of the garden is a meters.
- The distance from the fountain to the northern and southern edges of the garden is b meters.
- The part of the garden **outside of the circular fountain** will be covered with exactly 300 square meters of grass.



a. [4 points] Write a formula for b in terms of a.

b. [2 points] Write a formula for the function $P(a)$ which gives the rectangular perimeter of the garden in terms of a only.

c. [4 points] In the context of this problem, what is the domain of $P(a)$?