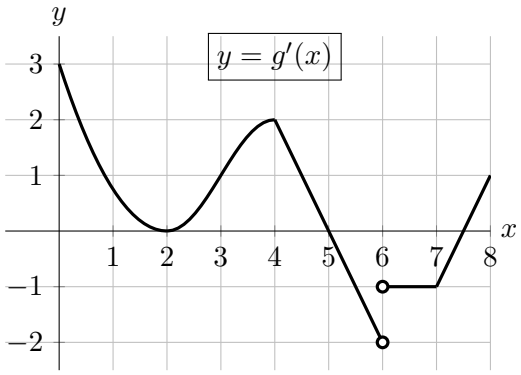
1. [17 points] Let $g(x)$ and $h(x)$ be two functions. The graphs of $g'(x)$ and $h''(x)$ are shown below.

At right is the graph of $y = g'(x)$, the **derivative** of $g(x)$.
Assume that $g(x)$ is a **continuous** function.
Use the graph to answer the questions below. Circle <u>all</u> correct answers.



a. [2 points] At which of the following values of x is $g(x)$ <u>not</u> differentiable?

$x = 2$ $x = 4$ $x = 5$ $x = 6$ $x = 7$ NONE OF THESE

b. [2 points] For which of the following values of x does $g(x)$ have a local maximum?

$x = 2$ $x = 4$ $x = 5$ $x = 6$ $x = 7.5$ NONE OF THESE

c. [2 points] For which of the following values of x does $g(x)$ have an inflection point?

$x = 2$ $x = 3$ $x = 4$ $x = 5$ $x = 7.5$ NONE OF THESE

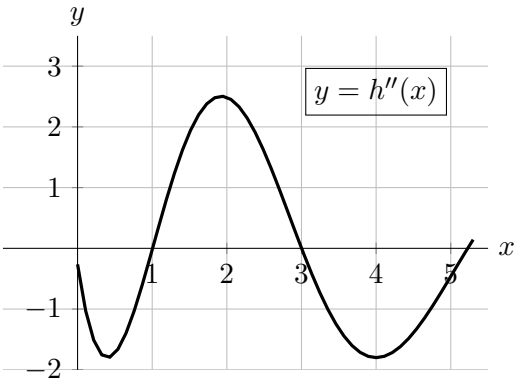
d. [2 points] On which of the following intervals is $g(x)$ linear?

$(0, 2)$ $(4, 6)$ $(6, 7)$ $(6, 8)$ $(7, 8)$ NONE OF THESE

e. [2 points] For which of the following values of x does $g(x)$ attain a global maximum on the interval $[1, 7]$?

$x = 2$ $x = 4$ $x = 5$ $x = 6$ $x = 7$ NONE OF THESE

Use the graph of $y = h''(x)$, the **second derivative** of $h(x)$, to answer the questions below. Circle <u>all</u> correct answers.



f. [2 points] Over which of the following intervals is $h(x)$ concave up on the entire interval?

$(0, 1)$ $(1, 3)$ $(2, 4)$ $(4, 5)$ NONE OF THESE

g. [2 points] On which of the following intervals is the function $h'(x)$ (the derivative of $h(x)$) decreasing over the entire interval?

$(0, 1)$ $(1, 3)$ $(2, 3)$ $(4, 5)$ NONE OF THESE

h. [3 points] If $h'(4) = 0$, which of the following statements <u>must</u> be true?

A. $x = 4$ is a local maximum of $h(x)$.
B. $x = 4$ is a local minimum of $h(x)$.
C. $x = 4$ is an inflection point of $h'(x)$.
D. $x = 4$ is a critical point of $h(x)$.
E. $x = 4$ is an inflection point of $h(x)$.
F. NONE OF THESE