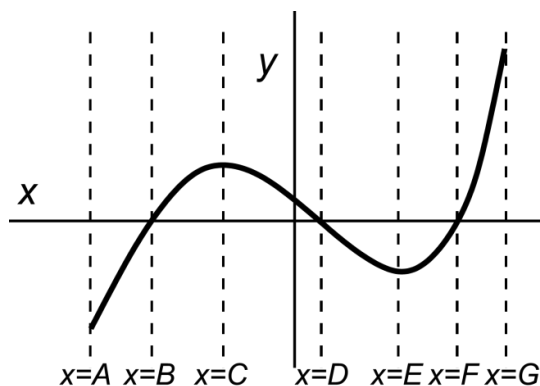


Increasing and Decreasing Function Behavior

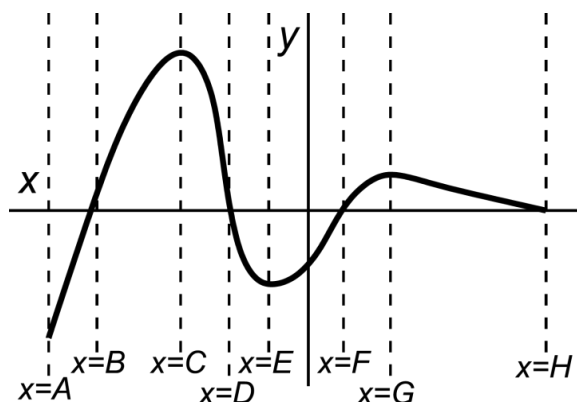
You're given three graphs. Each of them is labeled and accompanied by a set of questions. First, answer each question as well as you can individually – use complete sentences. Then compare your answers with those of your group members and discuss any differences.

1. To the right is a graph of the function $y = f(x)$, a function whose domain is the interval $[A, G]$.
 - a. Write any intervals in which the function $f(x)$ is increasing.
 - b. Write any intervals in which the function $f(x)$ is decreasing.



A graph of the function $y = f(x)$

2. To the right is a graph of the function $y = g'(x)$, the derivative of the function $g(x)$. The domain of this derivative is the interval $[A, H]$.
 - a. State the intervals in which the function $g(x)$ would be increasing. Give reasoning supporting each of your answers.

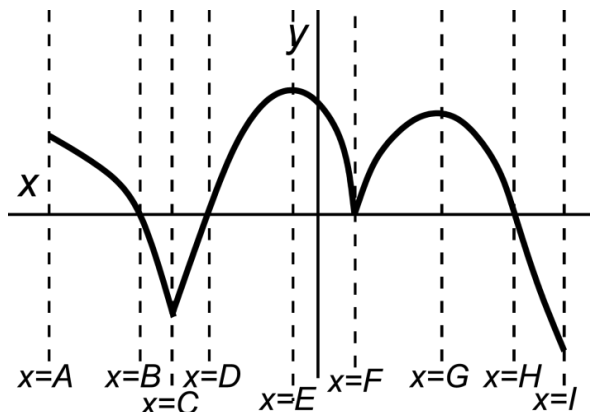


A graph of the function $y = g'(x)$

- b. State the intervals in which the function $g(x)$ would be decreasing. Give reasoning supporting each of your answers.

3. To the right is a graph of the function $y = h'(x)$, the derivative of the function $h(x)$. The domain of this derivative is the interval $[A, I]$.

a. State the intervals in which the function $h(x)$ would be increasing. Give reasoning supporting each of your answers.



A graph of the function $y = h'(x)$

b. State the intervals in which the function $h(x)$ would be decreasing. Give reasoning supporting each of your answers.

Check your understanding

- When looking at the graph of a function, how can you tell whether the value of that function is *positive* or *negative*?

- What condition on the derivative of a function would guarantee that the original function is *increasing* in a given interval?

- What condition on the derivative of a function would guarantee that the original function is *decreasing* in an interval?

Apply Your Understanding: Justifying Behaviors of Functions

Part I: Following is the graph of two functions defined on the interval $[A, I]$. One function is $g(x)$ whose graph is the **solid curve**. The other function is $h(x)$ whose graph is the **dashed curve**. One of these functions is the derivative of the other. That is, either $g(x) = h'(x)$ or $h(x) = g'(x)$. Decide which of these alternatives is correct and support your assertion with as many specific facts regarding features of the graphs as you can.

