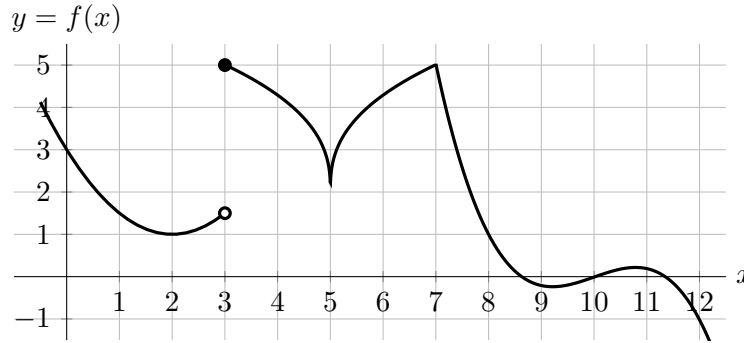**6**. [4 points] The graph of the function $f(x)$ is shown below. Note that $f(x)$ has a vertical tangent line at $x = 5$.

$y = f(x)$

a. [2 points] On which of the following intervals does the function $f(x)$ satisfy the hypotheses of the Mean Value Theorem? Circle the correct answer(s).

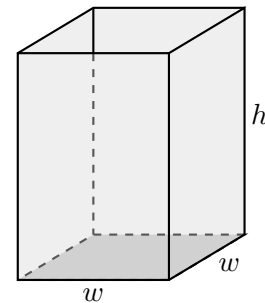[0,2]   [1,3]   [2,4]   [3,5]   NONE OF
                                                                                      THESE

b. [2 points] On the interval $[8, 12]$ the hypotheses of the Mean Value Theorem are true for the function $f(x)$. What does the conclusion of this theorem say in this interval?
Answer:

7. [5 points]
Yi is constructing a cardboard box. The base of the box will be a square of width w inches. The height of the box will be h inches. Yi will use gray cardboard for the sides of the box and brown cardboard for the bottom (the box does not have a top). Gray cardboard costs $0.05 per square inch, while brown cardboard costs $0.03 per square inch. Yi wants to spend $20 on the cardboard for his box.

Write a formula for h in terms of w.

Answer: $h =$ _____