Quiz 5.7

Name

1.

x	0	2	4	6	8	10
$f'(x)$	-1	0	-2	3	0	-1
$f''(x)$	8.333	-1.900	0.971	-0.304	0.400	-4.167

Let f be a twice-differentiable function. Selected values of f' and f'' are shown in the table above. Which of the following statements are true?

1. f has neither a relative minimum nor a relative maximum at $x = 2$.
2. f has a relative maximum $x = 2$.
3. f has a relative maximum $x = 8$.

(A) I only

(B) II only

(C) III only

(D) I and III only

2. Let f be a twice-differentiable function. Which of the following statements are individually sufficient to conclude that $x = 4$ is the location of the absolute maximum of f on the interval $[0, 10]$?

1. $f'(4) = 0$
2. $x = 4$ is the only critical point of f on the interval $[0, 10]$, and $f''(4) < 0$.
3. $x = 4$ is the only critical point of f on the interval $[0, 10]$, and $f(10) < f(0) < f(4)$.

(A) II only

(B) III only

(C) I and II only

(D) II and III only

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3. Let f be a function such that $f(1) = 2$. At each point (x, y) on the graph of f, the slope is given by $\frac{dy}{dx} = 5xy - x^2 - y^2 - 5$. Which of the following statements is true?

(A) f has a relative minimum at $x = 1$.

(B) f has a relative maximum at $x = 1$.

(C) f has neither a relative minimum nor a relative maximum at $x = 1$.

(D) There is insufficient information to determine whether f has a relative minimum, a relative maximum, or neither at $x = 1$.