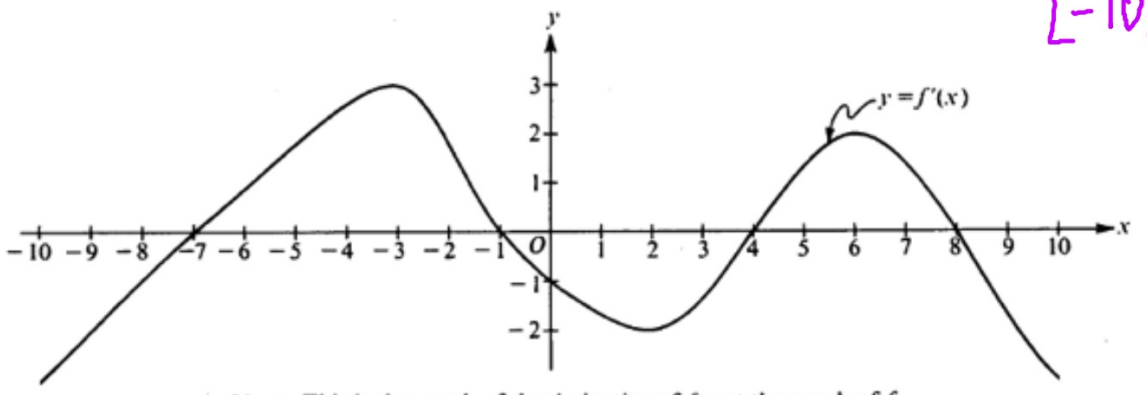
Interpreting Derivative Graphs

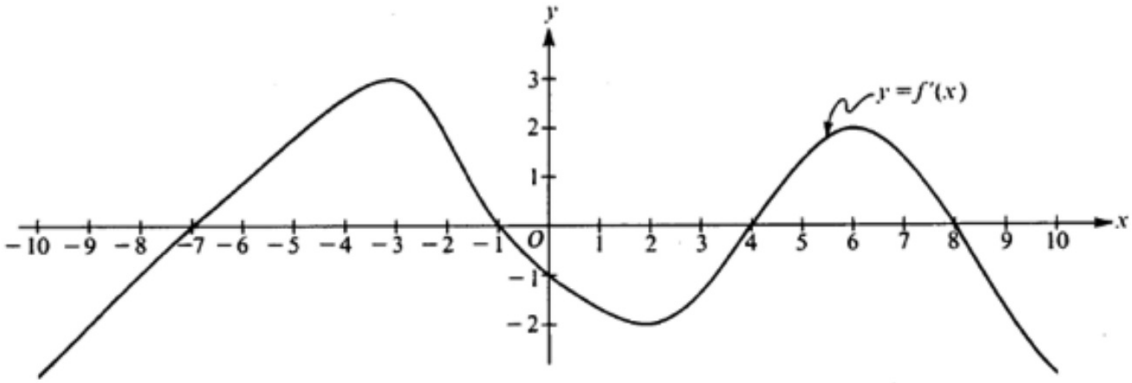
[-10,10]



Note: This is the graph of the derivative of f, not the graph of f.

Is f(x) differentiable on the entire interval?

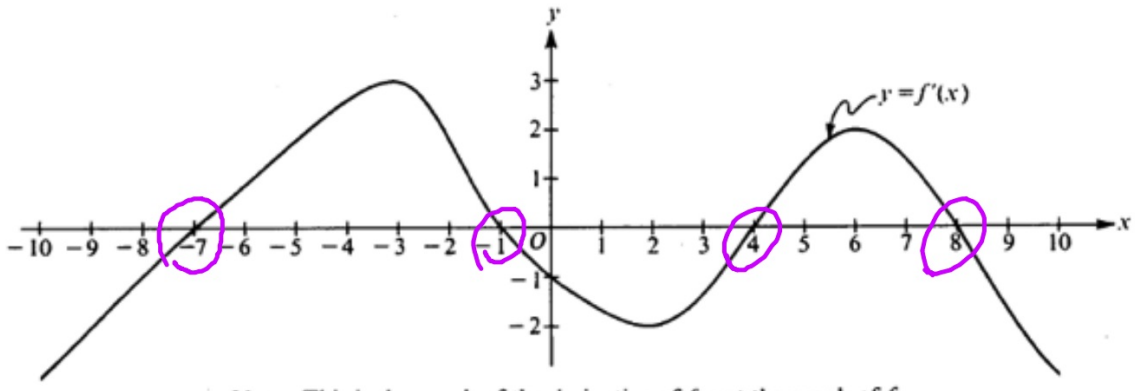
yes f'(x) is continuous.



Note: This is the graph of the derivative of f, not the graph of f.

Is f(x) continuous on the entire interval?

f'(x) is continuous

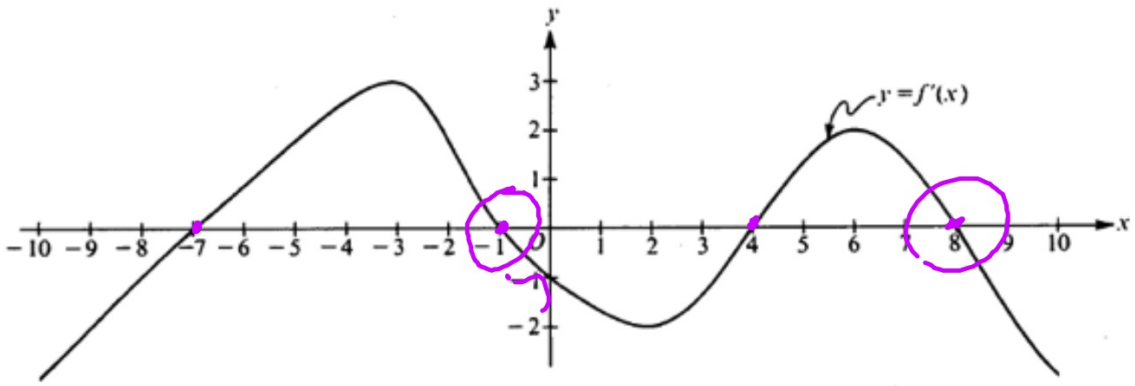


Note: This is the graph of the derivative of f, not the graph of f.

Where is the derivative zero?

$f'(x) = 0$

at thes x-values



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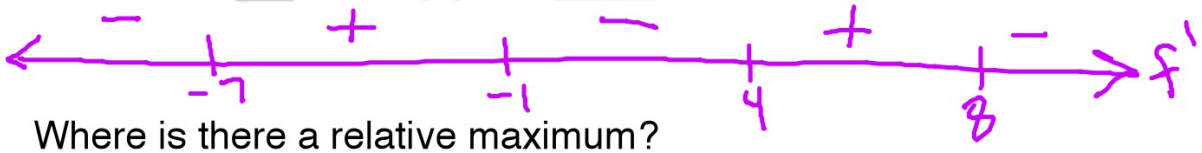
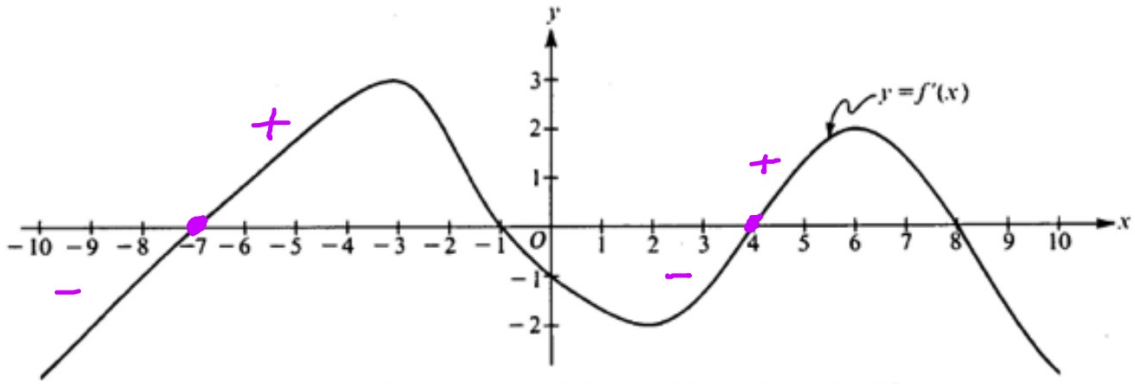


Where is there a relative maximum?

+/−

$x = -1, \; x = 8$

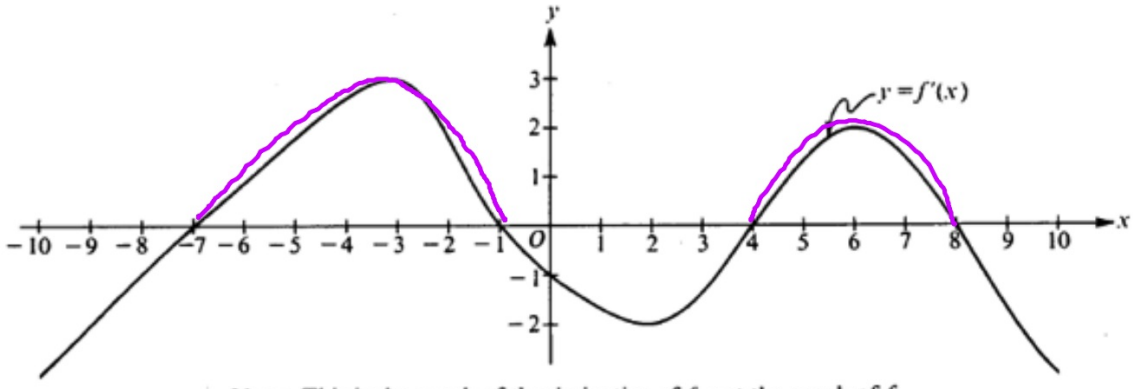
f' changes from pos. to neg. at these x-values.



Note: This is the graph of the derivative of f, not the graph of f.

Where is there a relative minimum?

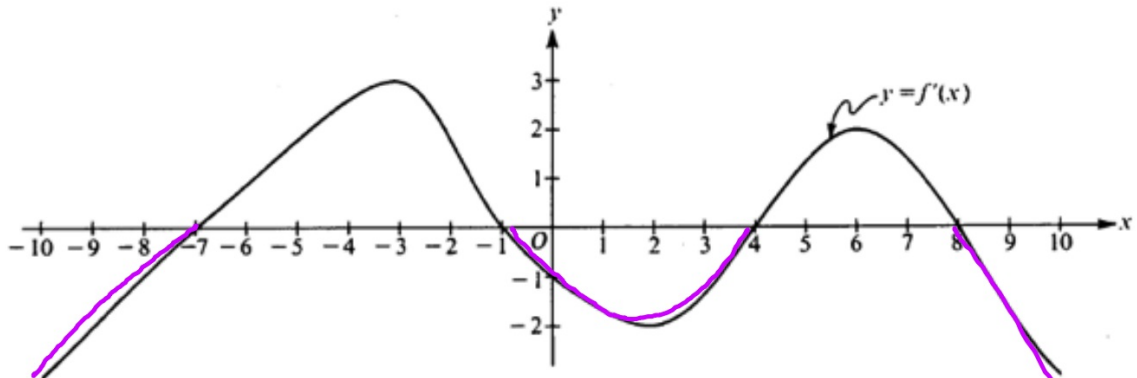
$x = -7, 4$ because f' changes from neg. to pos. at these x-values.



Note: This is the graph of the derivative of f, not the graph of f.

Where is f(x) increasing?

$(-7,-1) \cup (4,8)$ because $f' > 0$ on these intervals

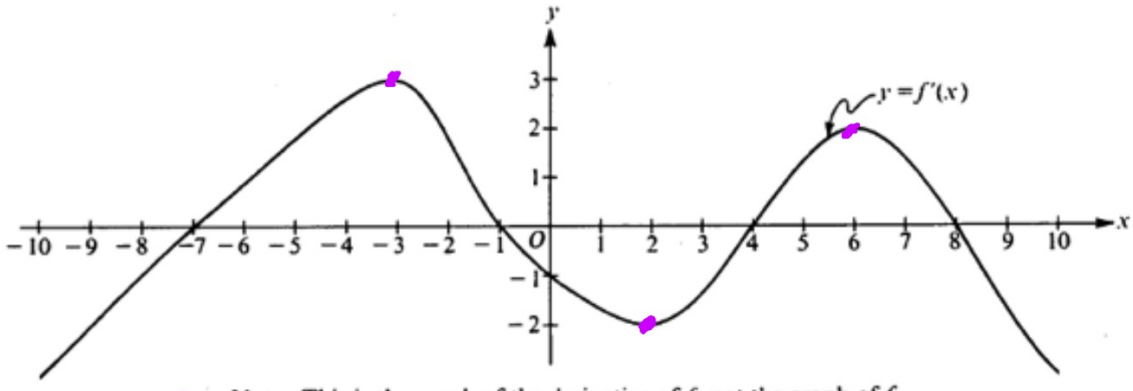


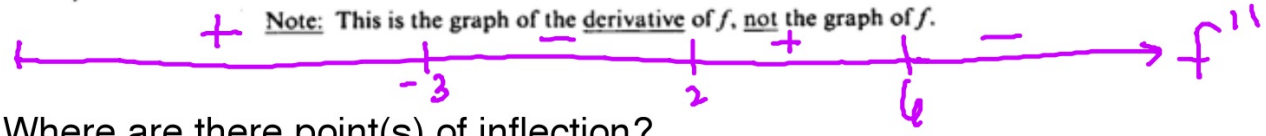
Note: This is the graph of the derivative of f, not the graph of f.

Where is f(x) decreasing?

$(-10,-7) \cup (-1,4) \cup (8,10)$

because $f' < 0$ on those intervals

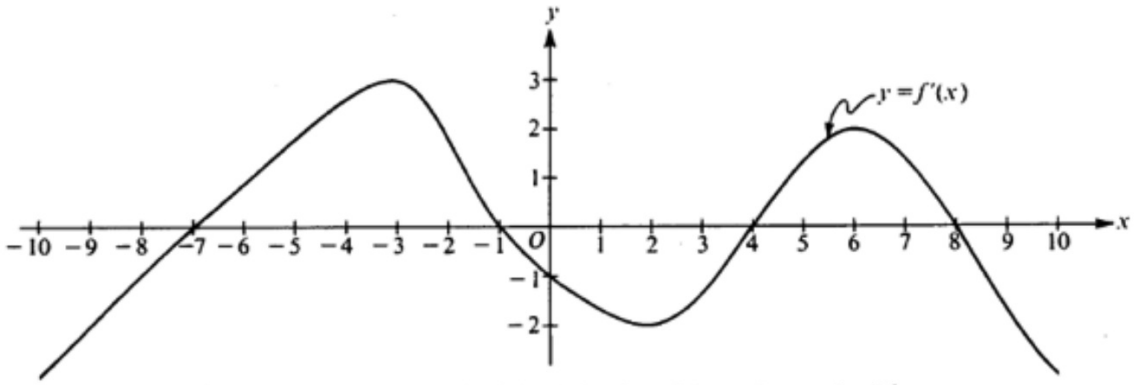




Where are there point(s) of inflection?

$x=-4$, $x=2$, $x=6$

- slope of f' is changing signs
- there is relative extrema at these x-values.
- f'' changes signs at these x-values



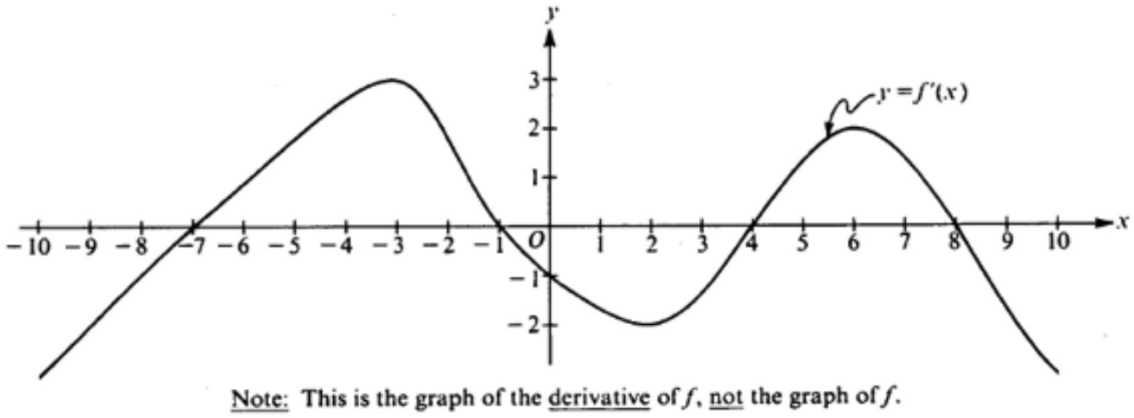
Note: This is the graph of the derivative of f, not the graph of f.

Where is f(x) concave up?

$(-10,-3) \cup (2,6)$ because the slope of $f' > 0$

because f' is increasing

because $f'' > 0$

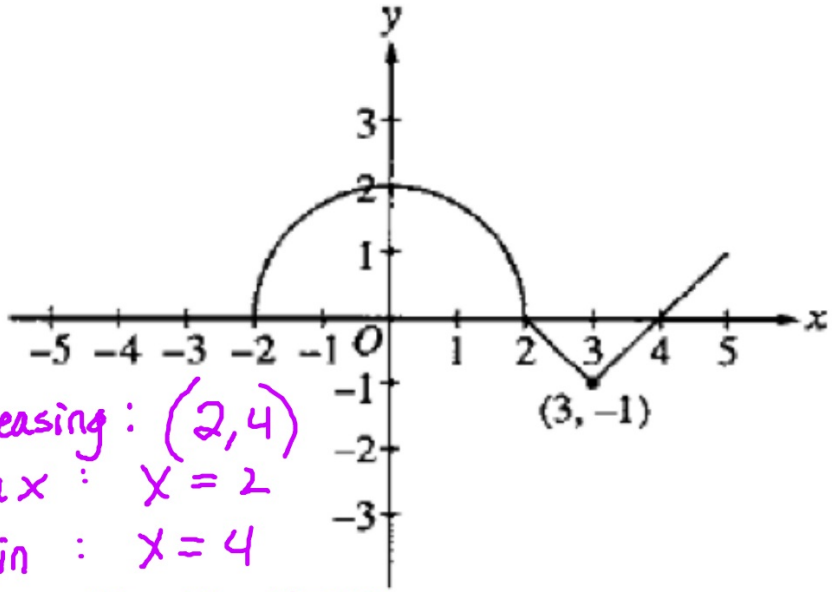


Note: This is the graph of the derivative of f, not the graph of f.

Where is f(x) concave down?

$(-3, 2) \cup (6, 10) \ldots$

slope of f' < 0 OR
f' is decreaing OR
f'' < 0



[-2, 5]

f decreasing : (2, 4)

rel. max : $x = 2$

rel min : $x = 4$

POI : $x = 0, x = 3$