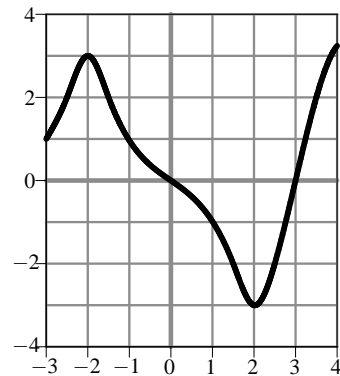


These are problems from midterm 1 in previous years that cover topics omitted from our first midterm. These might (or might not) appear on our second midterm.

5. At right is the graph of **the derivative** f' of a function.

- (a) 4 points List all values of x with $-3 \leq x \leq 4$ where $f(x)$ has a local maximum.

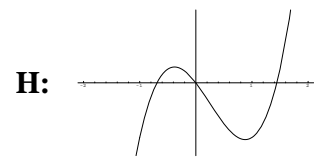
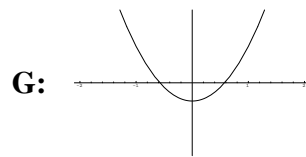
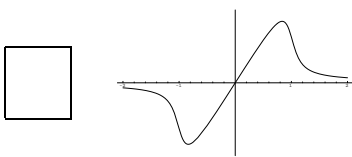
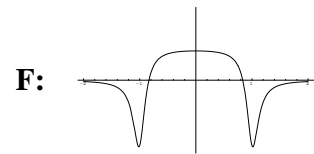
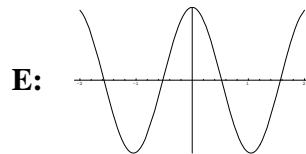
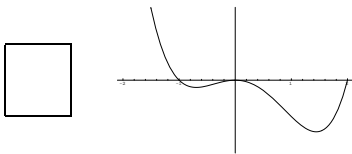
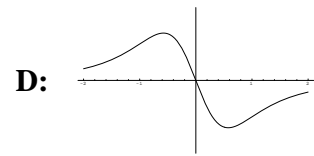
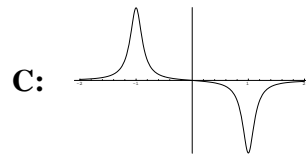
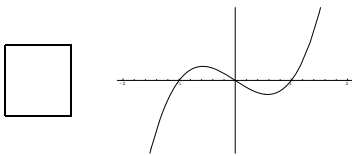
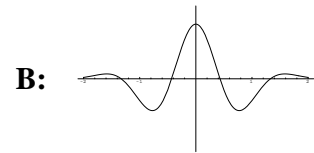
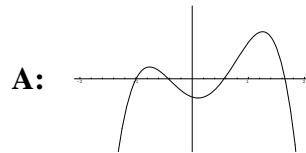
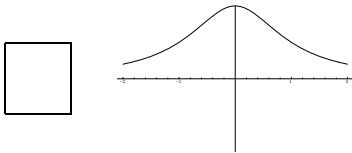


- (b) 4 points At $x = -1$, is $f(x)$ concave up, concave down, or neither?

Name: _____

Id: _____

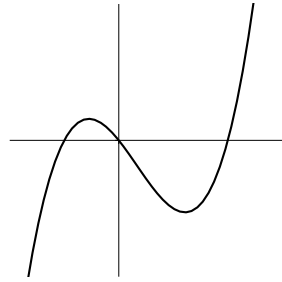
6. 16 points For each of the 4 functions graphed in the left column, find the corresponding derivative function among any of the 8 choices on the right (not just on the same row) and put its letter in the corresponding box.



Name: _____

Id: _____

6. At right is the graph of **the derivative** $f'(x)$ of a function $f(x)$. Use it to answer each of the following questions.

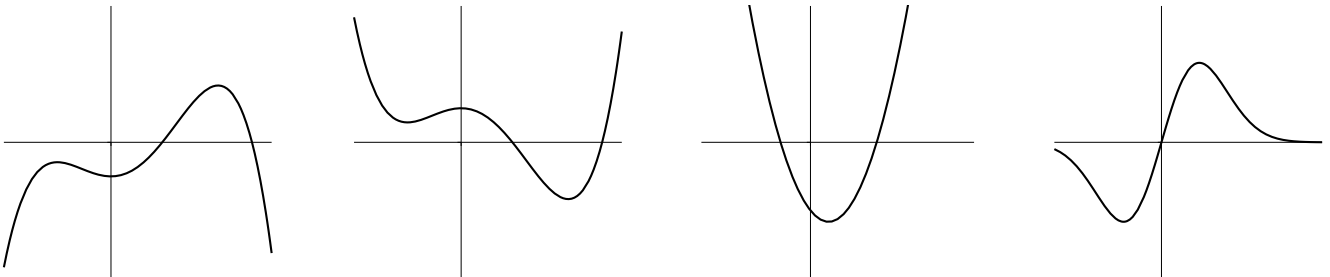


4 points

(a) Is $f(x)$ concave up, concave down, or neither at $x = 0$?

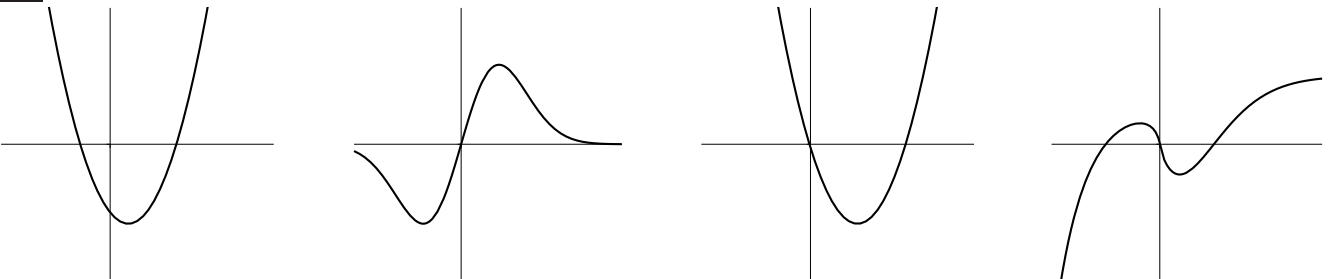
4 points

(b) Which of the following best represents the graph of $f(x)$? (circle your answer).



4 points

(c) Which of the following best represents the graph of $f''(x)$? (circle your answer).



Name: _____

Id: _____

8 points

3. In the paragraph below is a description of how the amount of water $W(t)$ in a tub varied with time.

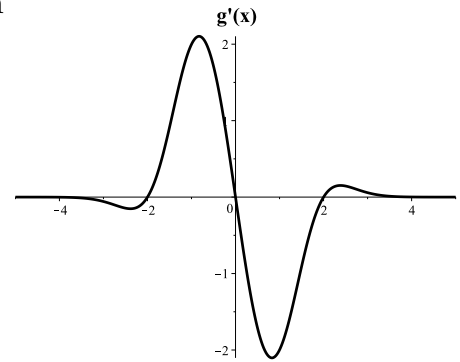
The tub held about 50 gallons of green, brackish water, with some stuff floating in it that I didn't even want to guess about. I had to get it out of there. When I opened the drain the water drained out rapidly at first, but then it went slower and slower, until it stopped completely after about 5 minutes. The tub was about $1/4$ -full of that nasty stuff. Would I have to stick my hand in it? *Ick*—there was no way I could do that. I just stared at it for a couple of minutes, but then I got an idea. I dumped in about 10 gallons of boiling water. That did something: there was this tremendous noise like *BLUUUUURP*, and then the tub drained steadily, emptying completely in just a minute or so.

Use this description to sketch a graph of $W(t)$ and its derivative $W'(t)$. Pay careful attention to slope and concavity. Label the axes, with units.

Name: _____

Id: _____

7. At right is the graph of **the derivative** $g'(x)$ of a function $g(x)$. Use it to answer each of the following questions.



2 points

- (a) List all values of x in the interval $[-5, 5]$ where $g(x)$ has a local maximum.

2 points

- (b) List all values of x in the interval $[-5, 5]$ where $g(x)$ has a local minimum.

4 points

- (c) Assuming that the $g'(x)$ behaves the same for $x > 5$ as it does for $4 < x < 5$, which of the following should be true (circle your answer)?

- A. $\lim_{x \rightarrow \infty} g(x) = +\infty$
- B. $\lim_{x \rightarrow \infty} g(x)$ is a finite number
- C. $\lim_{x \rightarrow \infty} g(x) = -\infty$
- D. $\lim_{x \rightarrow \infty} g(x)$ does not exist
- E. $\lim_{x \rightarrow \infty} g(x)$ can not be determined from this information

WHY? Justify your answer below. No credit without a justification.