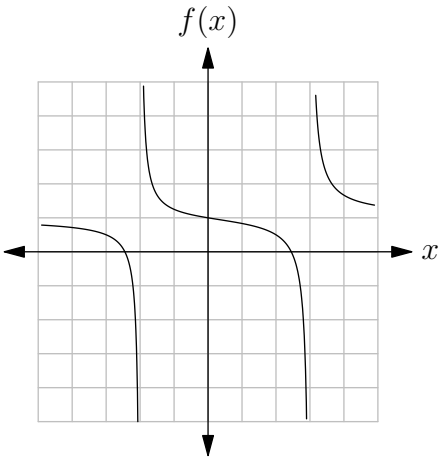
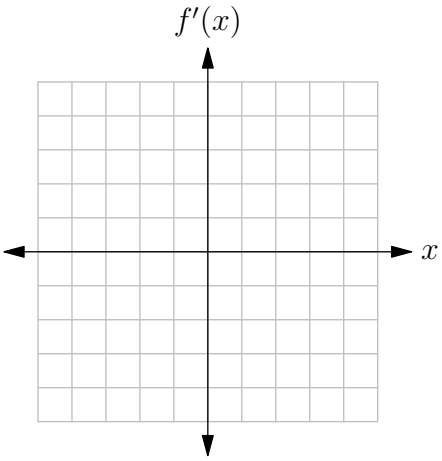
Quiz 12

MAT 201, Spring 2017

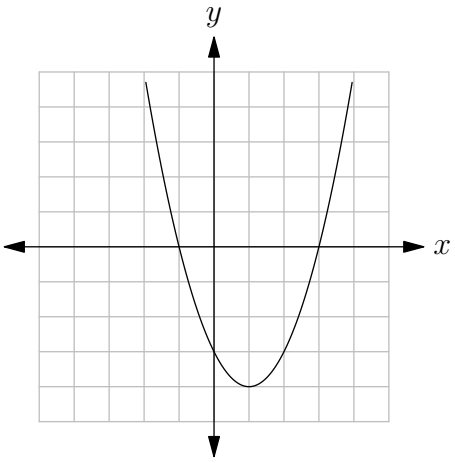
Name:

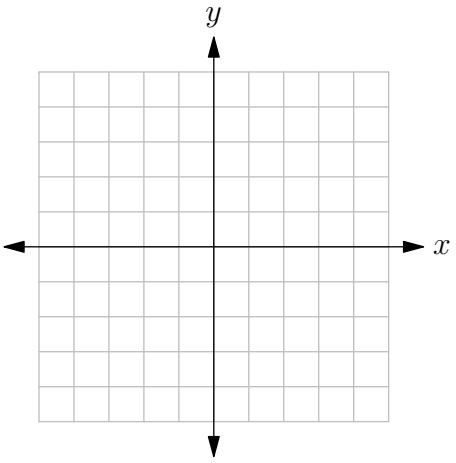
1. The graph of $f(x)$ is shown in the figure. Sketch the graph of $f'(x)$.





2. The graph of $f'(x)$ is shown in the figure. Sketch the graph of $f(x)$.



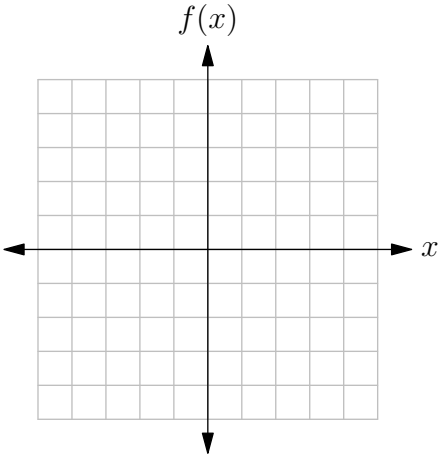


3. Out of question 1 and 2 above, which has a second answer? Sketch your second answer on the corresponding axes.

In questions 4 to 6, sketch a graph of a function $f(x)$ that satisfies the given conditions.

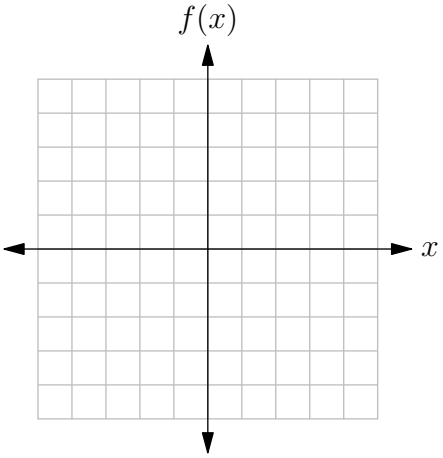
4.

$$f'(-2) = 0,\ f'(0) = 0,\ f'(2) = 0$$
$$f'(x) > 0 \text{ if } x \text{ is in } (-\infty, -2) \cup (0, 2)$$
$$f'(x) < 0 \text{ if } x \text{ is in } (-2, 0) \cup (2, \infty)$$
$$f''(x) > 0 \text{ if } x \text{ is in } (-1, 1)$$
$$f''(x) < 0 \text{ if } x \text{ is in } (-\infty, -1) \cup (1, \infty)$$



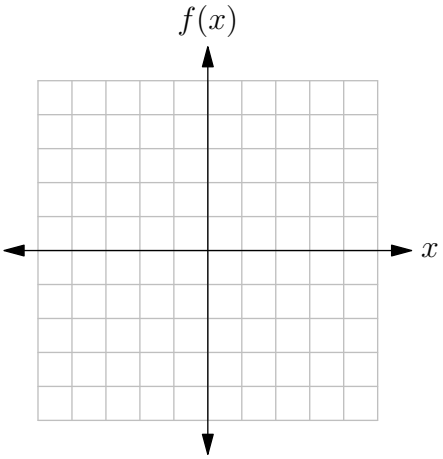
5.

$$f'(-3) = 0$$
$$f'(x) > 0 \text{ if } x \text{ is in } (-\infty, -3) \cup (1, \infty)$$
$$f'(x) < 0 \text{ if } x \text{ is in } (-3, 1)$$
$$\lim_{x \to 1^-} f(x) = -\infty \text{ and } \lim_{x \to 1^+} f(x) = -\infty$$
$$f''(x) < 0 \text{ if } x \neq 1$$



6.

the domain of $f(x)$ is $(0, \infty)$
$f'(x)$ is always positive
$f''(x)$ is always negative



For the functions in questions 7 to 9:

(a) Find the domain.

(b) Give all the critical points and all the intervals where the function is increasing/decreasing. Also classify each critical point as a local minimum, local maximum, or neither.

(c) Give all inflection points and all the intervals where the function is concave up or concave down.

(d) Sketch the graph.

7. $g(x) = x^4 - 6x^2$

8. $A(x) = x\sqrt{x+3}$

9. $y(x) = (x-1)e^{-x}$