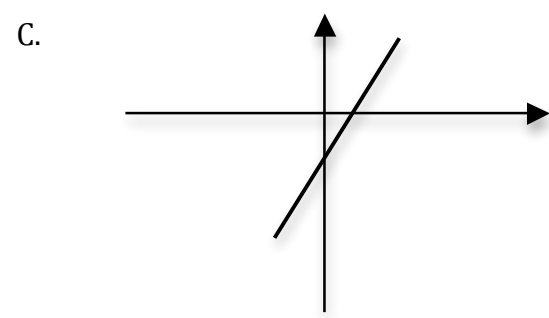
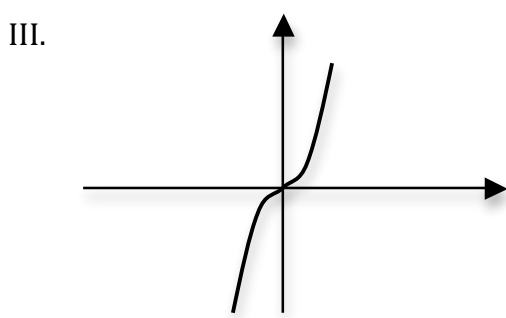
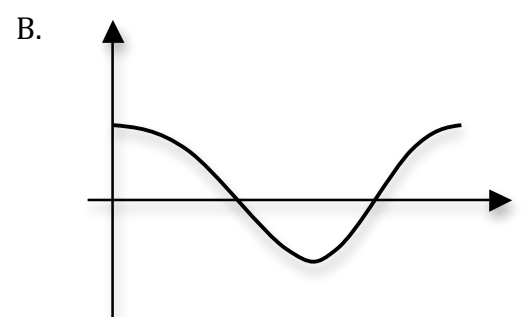
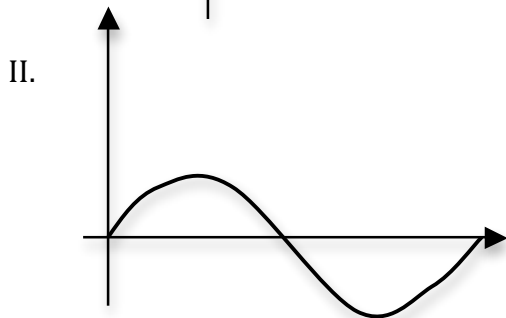
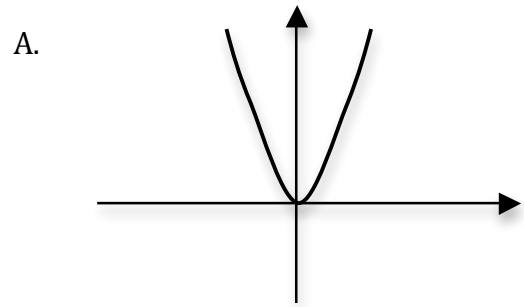
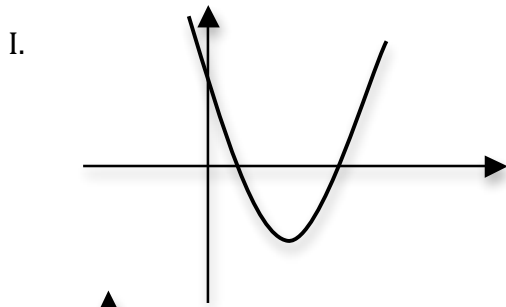
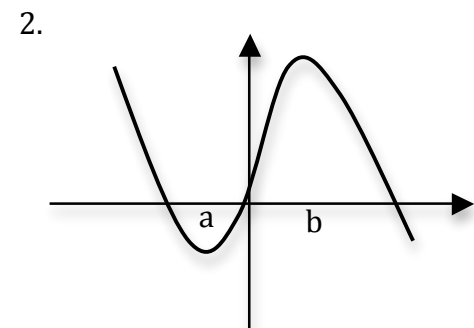
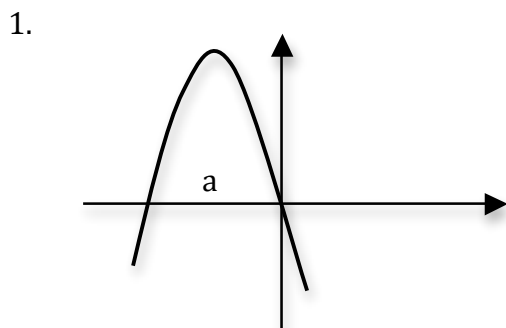


Part I. Match the graphs of functions I, II, and III to the graphs of their derivatives A, B, and C.

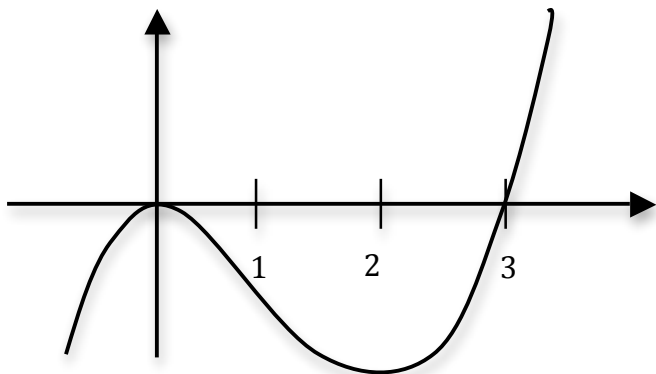


Part II. Create a chart to show intervals on which the function is increasing/decreasing and on which the derivative is positive/negative. Sketch the graph of the derivative on the same set of axes as the function.



Part III. Multiple choice.

Refer to the figure for Questions 3 -6.



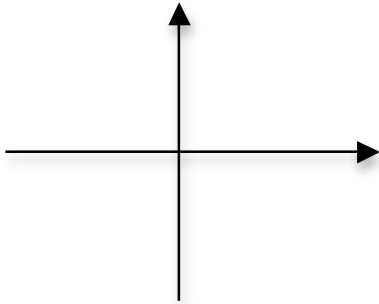
3. On what interval is  $f(x)$  positive?
- a.  $(0, \infty)$       b.  $[1, \infty)$       c.  $[2, \infty)$       d.  $(3, \infty)$       e.  $(0, 3)$
4. On what interval(s) is the slope of the tangent to the graph of  $f(x)$  positive?
- a.  $(-\infty, 0)$  and  $(2, \infty)$     b.  $(-\infty, 0)$       c.  $(0, 2)$       d.  $(2, \infty)$       e.  $(-\infty, 2)$
5. The critical value(s) of  $f(x)$  is (are)  $x =$
- a. 2      b. 0 and 2      c. 0      d. 0 and 3      e. 3
6. On what interval(s) is the derivative of  $f(x)$  increasing?
- a.  $(0, \infty)$       b.  $(1, \infty)$       c.  $[3, \infty)$       d.  $(-\infty, 1]$  and  $[3, \infty)$     e.  $[2, \infty)$
7. The graph of the derivative of  $f(x) = 2x + 3$  is
- a. a horizontal line    b. a vertical line    c. a line with a positive slope  
d. a line with a negative slope    e. a parabola
8. The derivative of  $f(x) = -\frac{1}{2}x + 5$  has the equation
- a.  $x = 0$       b.  $y = 0$       c.  $x = -\frac{1}{2}$       d.  $y = -\frac{1}{2}$       e.  $y = 5$
9. The graph of the derivative of  $f(x) = x^2$  is
- a. a horizontal line    b. a vertical line    c. a line with a positive slope  
d. a line with a negative slope    e. a line with  $y$ -intercept 2

Part IV. Free Response. No calculator allowed.

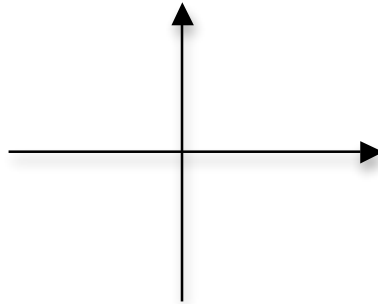
(Before sketching the derivatives, it would be helpful to sketch the function.)

10. Sketch the graph of the derivative of each function.

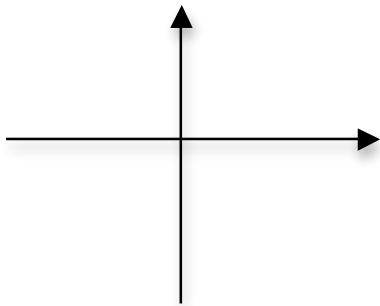
a.  $y = x$



b.  $y = 2$

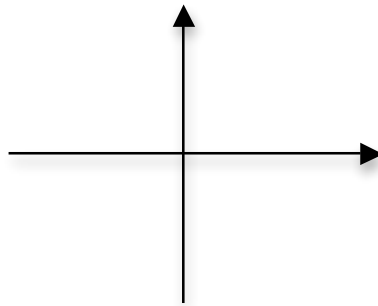


11. Sketch the graph of the derivative of  $y = |x - 1|$ .



12. Sketch the graph of the derivative of

$$f(x) = \begin{cases} x + 2, & x \leq 1 \\ x - 2, & x > 1 \end{cases}$$



13. Discuss the continuity of the functions in questions 11 and 12 and the existence of the derivative of each function at  $x = 1$ .