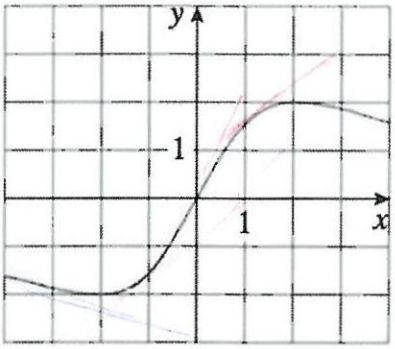
Solutions

Math 1300-402 - Summer 2016

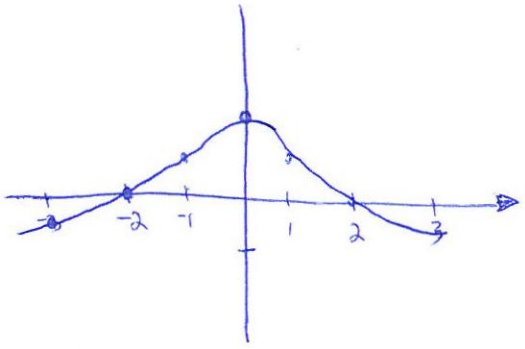
Derivative Function Activity - 6/14/16

Guidelines: Please work in your project groups. As you finish problems, raise your hand and call me over to check your work. This will not be handed in and is a study resource for the next midterm.

1. Use the given graph to estimate the value of each derivative. The sketch the graph of f' to the right.



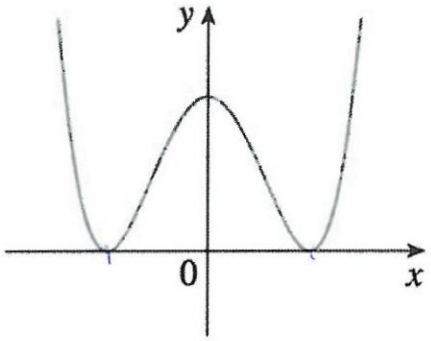
(a) $f'(-3) = -1/3$
(b) $f'(-2) = 0$
(c) $f'(-1) = 2/3$
(d) $f'(0) = 2$
(e) $f'(1) = 2/3$
(f) $f'(2) = 0$
(g) $f'(3) = -1/3$

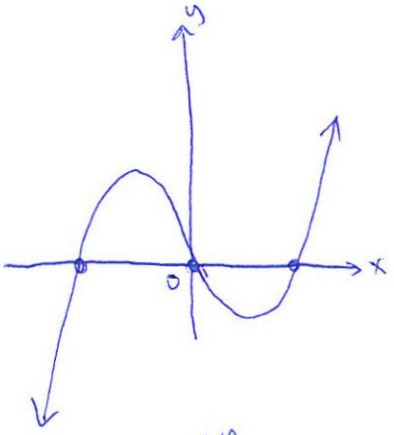


Some of your answers may vary slightly, but $f'(-2) = f'(2) = 0$ should be there.

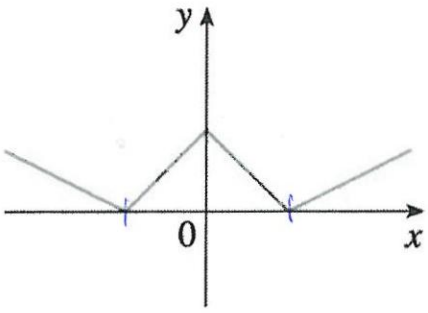
2. Below is the graph of a differentiable function f. Redraw the axes to the right, assuming the same scale, and sketch a graph of f'.

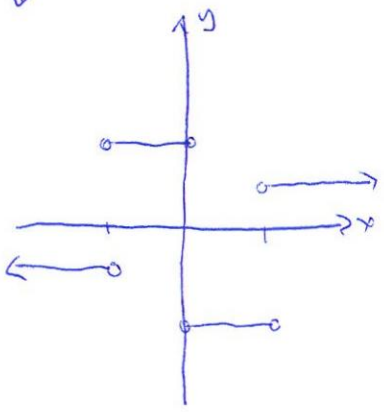
(a)





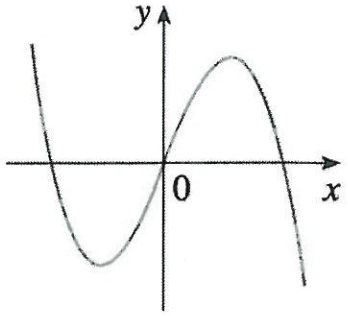
(b)





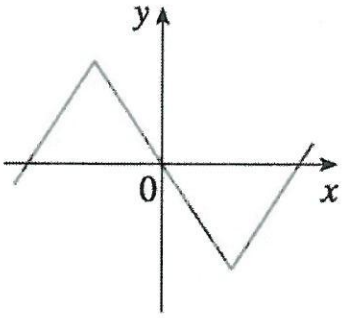
3. Match the graph of each function in $(a)-(d)$ with the graph of its derivative in $I-IV$. Give reasons for your choices.

(a)



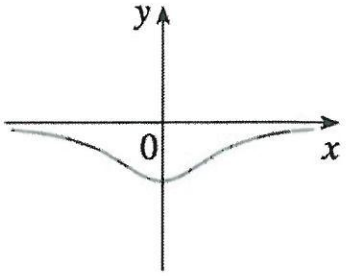
II

(b)



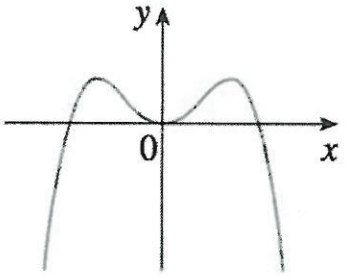
IV

(c)



I

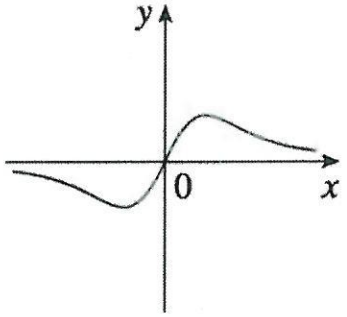
(d)



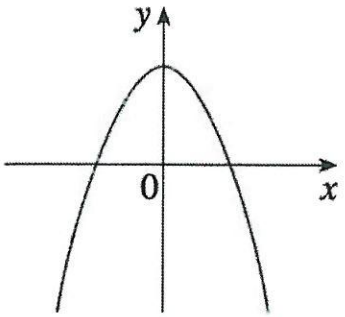
III

I'll leave the explanations for you to figure out.

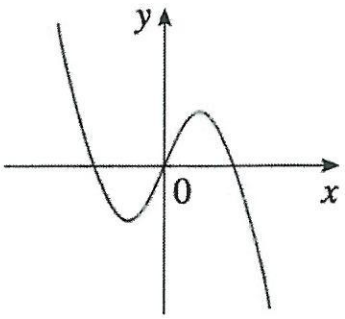
I



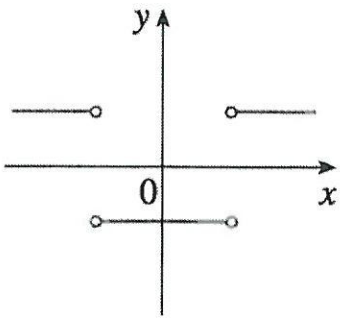
II



III

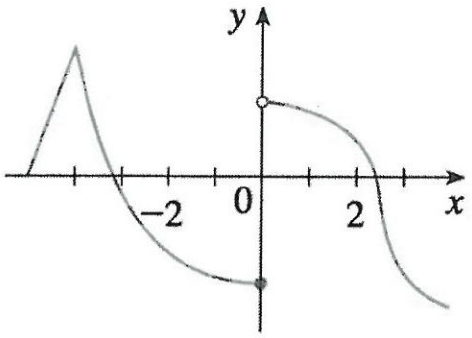


IV



4. The graph of f is given. State, with reasons, the numbers at which f is not differentiable.

(a)

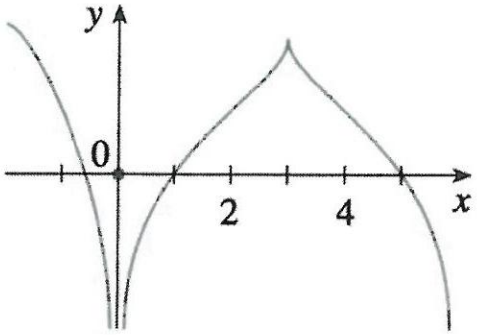


$x=-4$, cusp

$x=0$, jump discontinuity

$x=2\frac{1}{3}$, vertical tangent

(b)

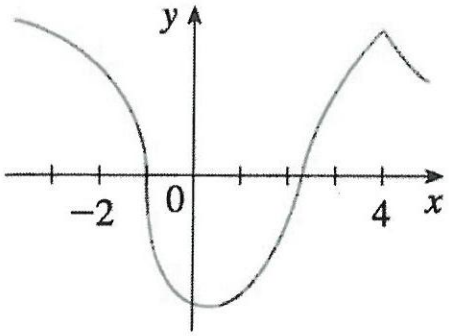


$x=0$, vertical asymptote (discontinuity)

$x=3$, cusp

$x=5$, vertical asymptote

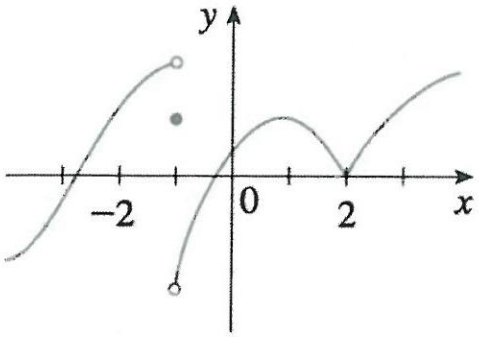
(c)



$x=1$, vertical tangent

$x=4$, cusp

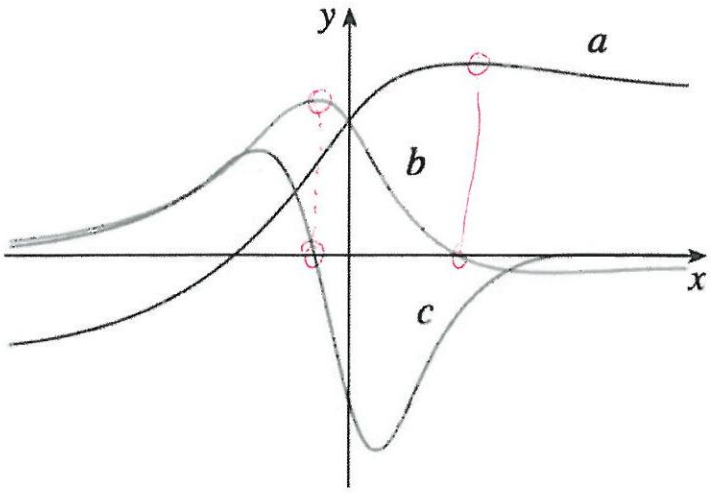
(d)



$x=-1$, discontinuity

$x=2$, cusp

5. The figure shows the graphs of f, f', and f''. Identify each curve, and explain your choices.

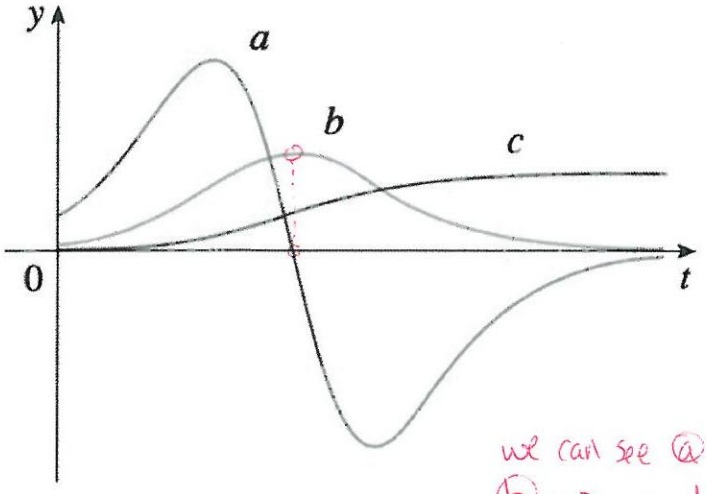


we can see (c) is the derivative of (b) and (b) is the derivative of (a)

$c = \frac{d}{dx} b$ and $b = \frac{d}{dx} a$

so $a = f$, $b = f'$, $c = f''$

6. The figure shows the graphs of three functions. One is the position function of a car, one is the velocity of the car, and one is its acceleration. Identify each curve, and explain your choices.



we can see (a) is the derivative of (b) $\rightarrow$ $a = \frac{d}{dt} b$

Also, (b) is the derivative of (c)... think about it!

$b = \frac{d}{dt} c$

so
- c = position
- b = velocity
- a = acceleration