Calculus

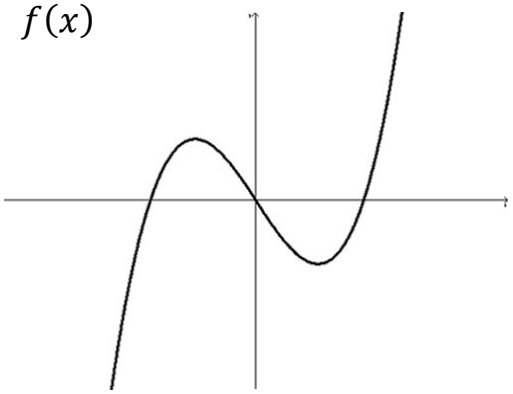
5.8 Sketching Graphs of Derivatives

Notes

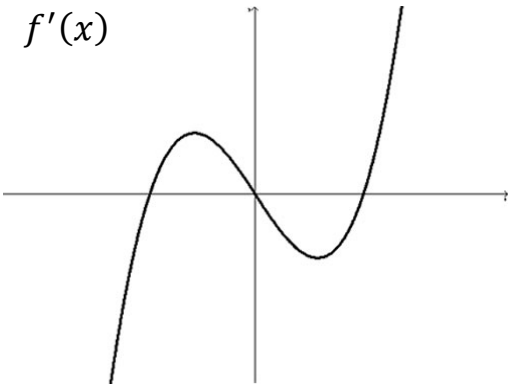
Write your questions and thoughts here!

Focus on the _____ of f. The _____ of f is the _____ of f'.

Sketch f' given the graph f



Sketch f given the graph f'



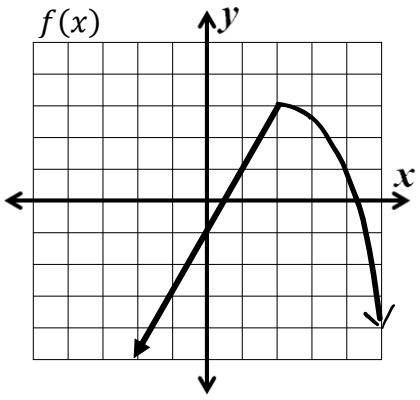
5.8 Sketching Graphs of Derivatives

Calculus

Practice

The graph of a function f is shown. On the same coordinate plane, sketch a graph of f', the derivative of f.

1.



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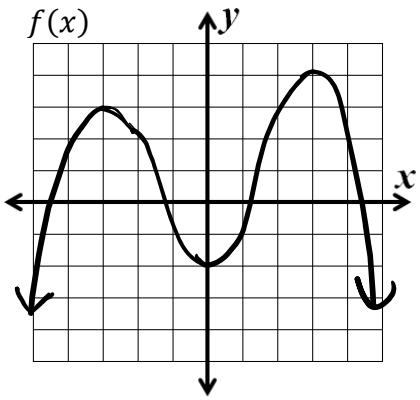
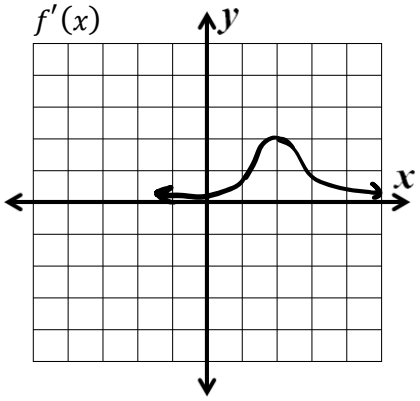


The graph of f', the derivative of f, is shown. On the same coordinate plane, sketch a possible graph of f.

3.



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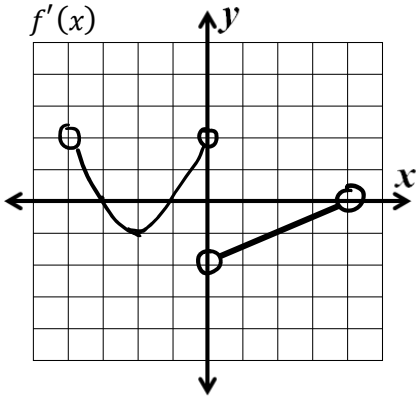
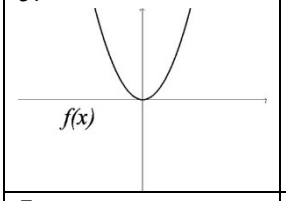
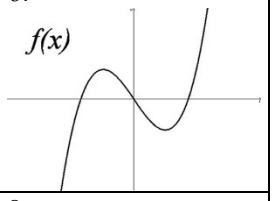
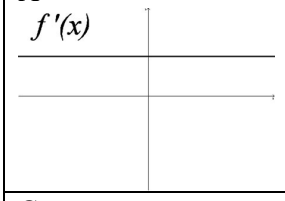
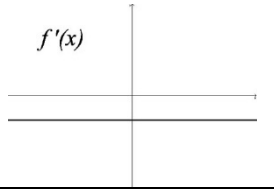
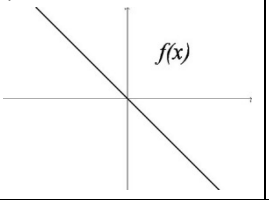
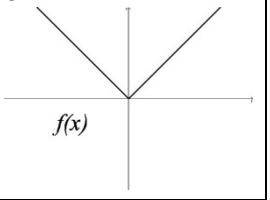
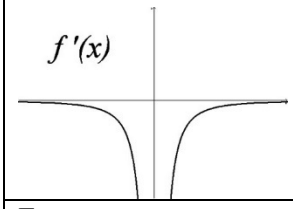
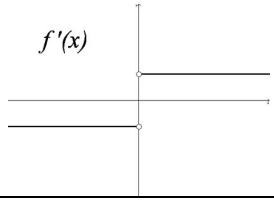
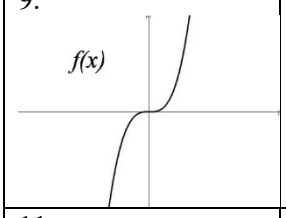
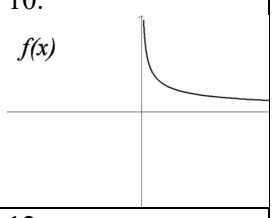
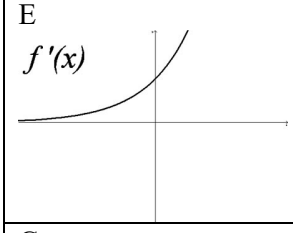
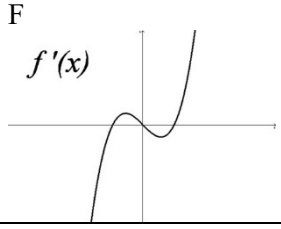
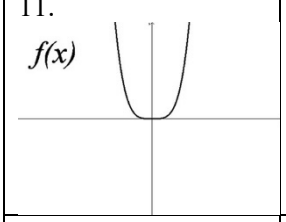
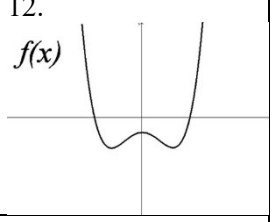
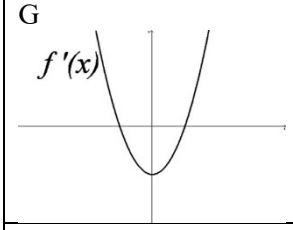
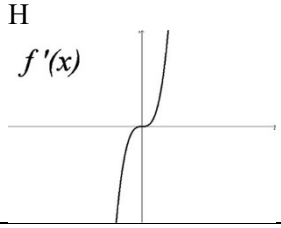
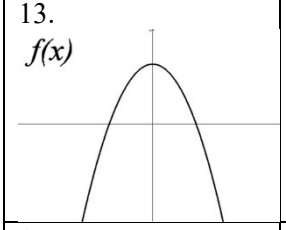
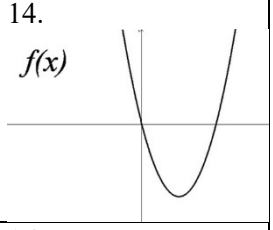
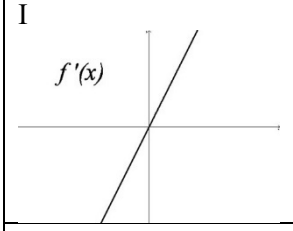
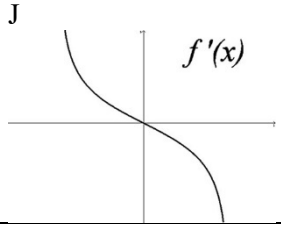
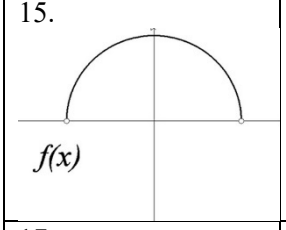
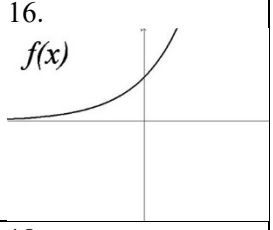
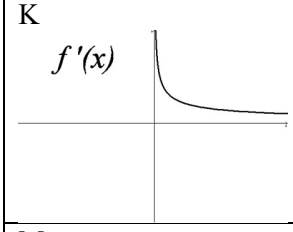
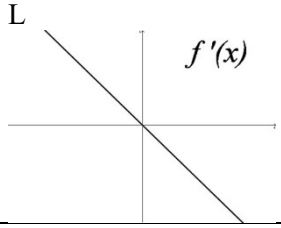
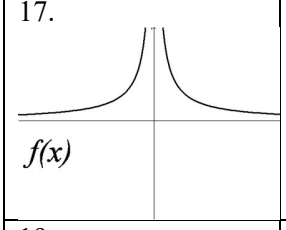
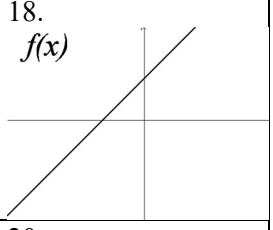
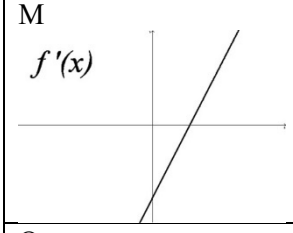
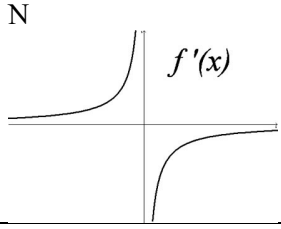
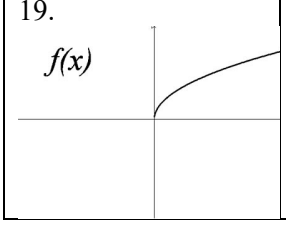
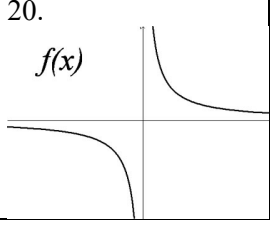
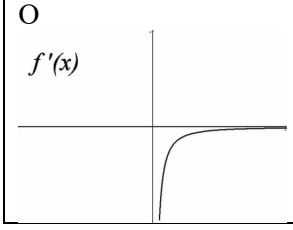
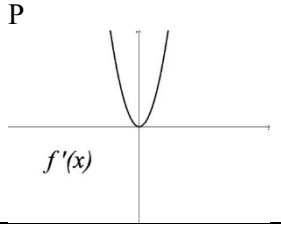
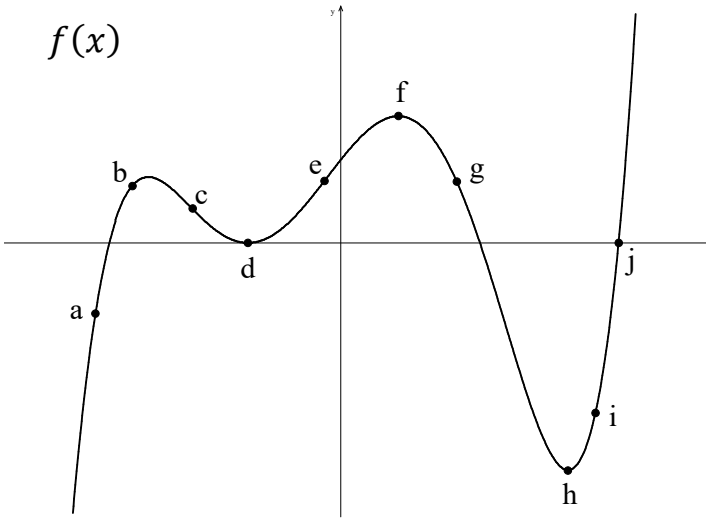


Match each function with the graph of its derivative.

Function			Derivative	
5. 	6. 	5. _____ 6. _____	A 	B 
7. 	8. 	7. _____ 8. _____	C 	D 
9. 	10. 	9. _____ 10. _____ 11. _____	E 	F 
11. 	12. 	12. _____ 13. _____	G 	H 
13. 	14. 	14. _____ 15. _____	I 	J 
15. 	16. 	16. _____ 17. _____	K 	L 
17. 	18. 	18. _____ 19. _____ 20. _____	M 	N 
19. 	20. 		O 	P 

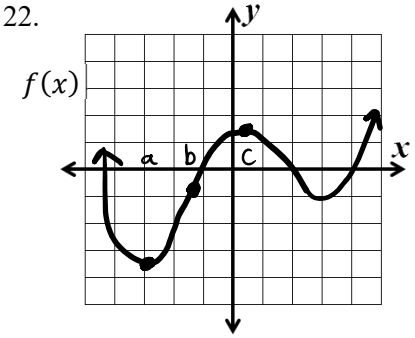
21. Using the figure below, complete the chart by indicating whether each value is positive (+), negative (-), or zero (0) at the indicated points. For these problems, if the point appears to be a max or min, assume it is. If it appears to be a point of inflection, assume it is.



x	a	b	c	d	e	f	g	h	i	j
$f(x)$										
$f'(x)$										
$f''(x)$										

Place the values of $f(x)$, $f'(x)$, and $f''(x)$ in increasing order for each point on the graph of $f(x)$. For these problems, if the point appears to be a max, min, or point of inflection assume it is.

22.



5.8 Sketching Graphs of Derivatives

Test Prep

23. The graph of the function f is shown in the figure to the right. For which of the following values of x is $f'(x)$ negative and decreasing.

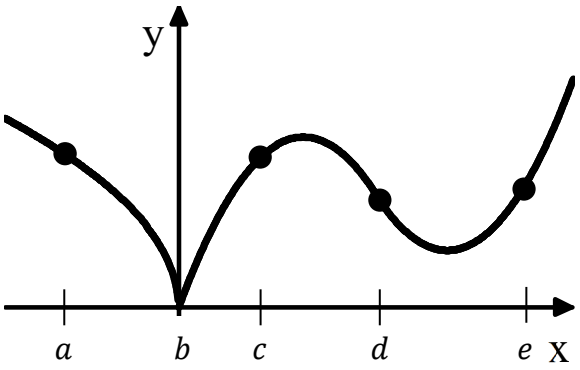
(A) a

(B) b

(C) c

(D) d

(E) e



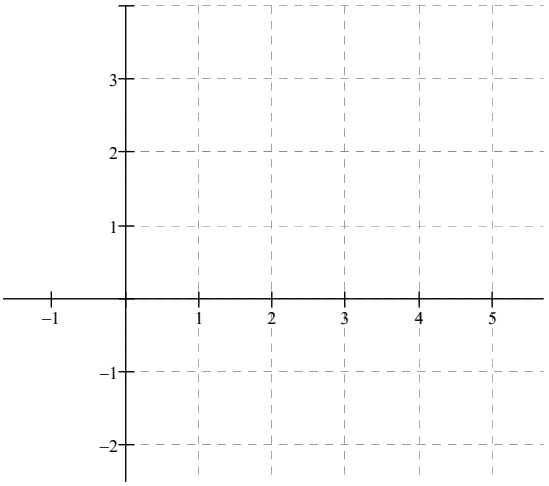
24. Let f be a function that is continuous on the closed interval $[0, 4]$. The function f and its derivatives have the properties indicated in the table below.

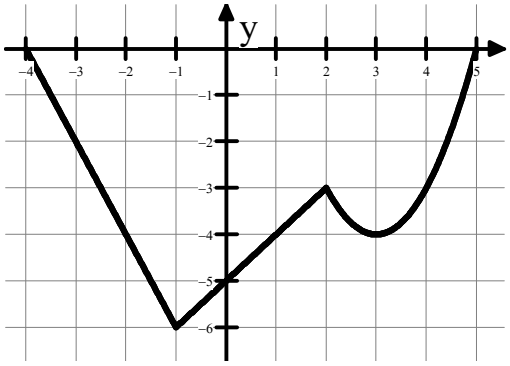
x	0	$0 < x < 1$	1	$1 < x < 2$	2	$2 < x < 3$	3	$3 < x < 4$	4
$f(x)$	1	Pos.	0	Neg.	-2	Neg.	0	Neg.	-1
$f'(x)$	0	Neg.	-20	Neg.	0	Pos.	DNE	Neg.	0
$f''(x)$	0	Neg.	0	Pos.	0	Pos.	DNE	Pos.	0

(a) Find the x-coordinate of each point at which f attains a maximum value or a minimum value.

(b) Find the x-coordinate of each point of inflection on the graph of f.

(c) In the xy-plane provided sketch the graph of a function with all the above characteristics of f.





Graph of $g(x)$

25. The continuous function g is defined on the closed interval $[-4, 5]$. The graph of g consists of two line segments and a parabola. Let f be a function such that $f'(x) = g(x)$.
    a. Fill in the missing entries in the table below to describe the behavior of g' and g''. Indicate Positive, Negative, or 0. Give reasons for your answers.

x	$-4 < x < -1$	$-1 < x < 2$	$2 < x < 3$	$3 < x < 5$
$g(x)$	Negative	Negative	Negative	Negative
$g'(x)$				
$g''(x)$				

b. There is no value of x in the open interval $(0, 3)$ at which $g'(x) = \frac{g(3)-g(0)}{3-0}$. Explain why this does not violate the Mean Value Theorem.

c. Find all values x in the open interval $(-4, 5)$ at which the graph of f has a point of inflection. Explain your reasoning.

d. At what value of x does f attain its absolute minimum on the closed interval $[-4, 5]$? Give a reason for your answer.