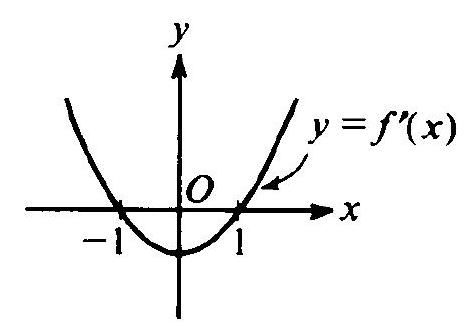
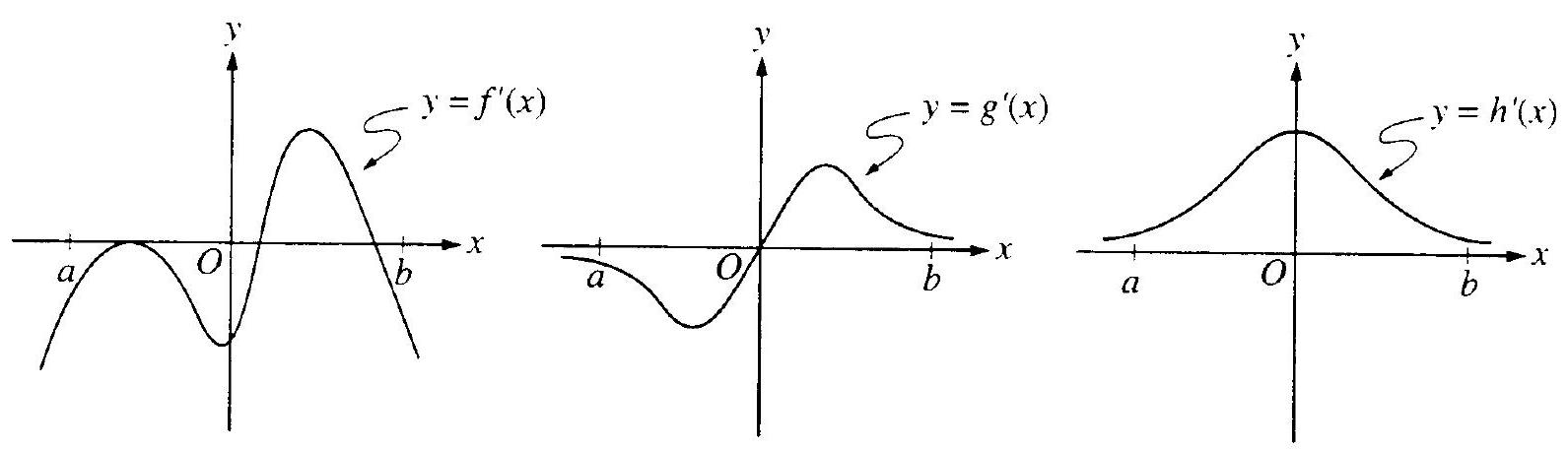
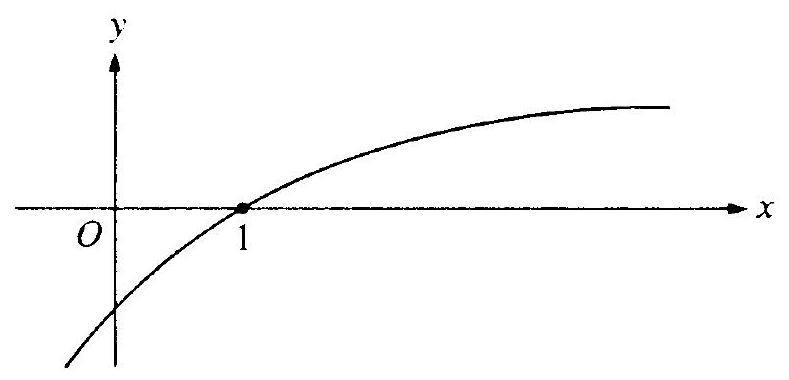
Derivatives Questions Draft

1. Given the function defined by , find all values of for which the graph of is concave up.  
   (A)   
   (B) or   
   (C) or   
   (D)   
   (E)
2. If , then the set of values for which increases is  
   (A)   
   (B)   
   (C)   
   (D)   
   (E)
3. If , for all , which of the following is true?
4. is increasing for all greater than 0 .
5. is increasing for all greater than 1 .
6. is decreasing for all between 0 and 1 .
7. is decreasing for all between 1 and .
8. is decreasing for all greater than .
9. At what values of does have a relative maximum?  
   (A) -1 only  
   (B) 0 only  
   (C) 1 only  
   (D) -1 and 1 only  
   (E) and 1
10. The graph of is concave downward for all values of such that  
    (A)   
    (B)   
    (C)   
    (D)   
    (E)
11. The absolute maximum value of on the closed interval occurs at   
    (A) 4  
    (B) 2  
    (C) 1  
    (D) 0  
    (E) -2
12. If the graph of has a point of inflection at , what is the value of ?  
    (A) -3  
    (B) 0  
    (C) 1  
    (D) 3
13. The function given by is
14. increasing for , decreasing for , increasing for
15. decreasing for , increasing for
16. increasing for all
17. decreasing for all
18. decreasing for , increasing for , decreasing for
19. The derivative of is . At how many points will the graph of have a relative maximum?  
    (A) None  
    (B) One  
    (C) Two  
    (D) Three  
    (E) Four
20. If , then the graph of is decreasing for all such that  
    (A)   
    (B)   
    (C)   
    (D)   
    (E)
21. The graph of is concave down for
22. or
23. or
24. The function given by has a relative maximum at   
    (A) -1  
    (B)   
    (C) 0  
    (D)   
    (E) 1
25. What is the -coordinate of the point of inflection on the graph of ?  
    (A) 5  
    (B) 0  
    (C)   
    (D) -5  
    (E) -10
26. A particle moves along the -axis so that its position at time is given by . For what value of is the velocity of the particle zero?  
    (A) 1  
    (B) 2  
    (C) 3  
    (D) 4  
    (E) 5
27. If , then the graph of has inflection points when   
    (A) -1 only  
    (B) 2 only  
    (C) -1 and 0 only  
    (D) -1 and 2 only  
    (E) , and 2 only
28. The function is given by . On which of the following intervals is increasing?
29. If is a differentiable function such that for all real numbers and if , which of the following is true?
30. has a relative maximum at and a relative minimum at .
31. has a relative minimum at and a relative maximum at .
32. has relative minima at and at .
33. has relative maxima at and at .
34. It cannot be determined if has any relative extrema.
35. If is the function defined by , what are all the -coordinates of points of inflection for the graph of ?  
    (A) -1  
    (B) 0  
    (C) 1  
    (D) 0 and 1  
    (E) , and 1
36. What is the derivative of ­?
37. At which coordinate is the tangent line to parallel to the line ?
    1. 0
    2. 1
    3. 2
    4. -2

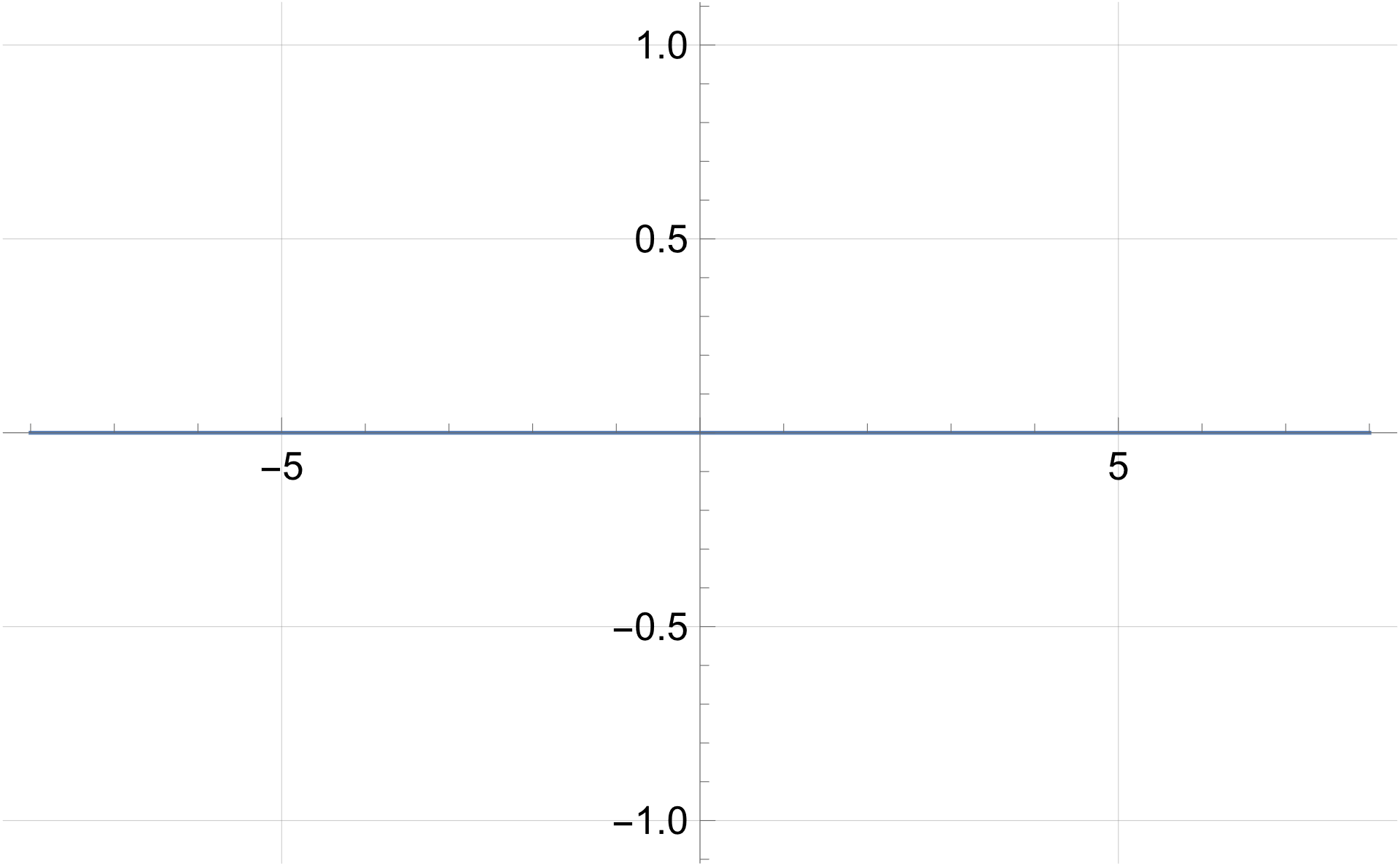


1. The graph of the derivative of is shown in the figure to the right. Which of the following could be the graph of ?

|  |  |  |
| --- | --- | --- |
| **A** | **B** | **C** |
| **D** | **E** |  |
|  |  |  |

1. The graphs of the derivatives of the functions , and are shown below. Which of the functions , or have a relative maximum on the open interval ?
2. only
3. only
4. only
5. and only
6. , and
7. The graph of a twice-differentiable function is shown in the figure below.   
     
     
   Which of the following is true?

Free Response

The function

has first derivative

and second derivative

**Sketch the graph of after completing the following questions:**

1. State any domain restrictions for
2. Determine any critical points of
3. State intervals on which is increasing or decreasing
4. State intervals on which is concave up or concave down
5. Calculate any horizontal asymptotes of