

①

## $f, f', f''$ Graphs

### 3.6: WKST DAY 1

① C      ② A      ③ B      ④ E      ⑤ D  
⑥ H      ⑦ J      ⑧ G      ⑨ F

⑩ C.P.  $x = -4, 0, 3, 5$

$f(x)$  inc:  $(-\infty, 0) \cup (5, \infty)$

$f(x)$  dec:  $(0, 5)$

Rel Max:  $x = 0$

Rel Min:  $x = 5$

POI:  $x = -4, -2, 1, 3, 4$

$f'(x)$  C.Up:  $(-4, -2) \cup (1, 3), (4, \infty)$

$f'(x)$  C.Down:  $(-\infty, -4) \cup (-2, 1) \cup (3, 4)$

⑪ X-int:  $(0, 0) + (3, 0)$

Inc. Int:  $(-\infty, 0) \cup (2, \infty)$

Y-int:  $(0, 0)$

Dec. Int:  $(0, 2)$

C. Points:  $x = 0, x = 2$

POI:  $(1, -2)$

R. Max:  $(0, 0)$

C.Up:  $(1, \infty)$

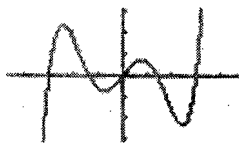
R. Min:  $(2, -4)$

C.Down:  $(-\infty, 1)$

**Match each graph of the function in the top row with the graph of the function's first derivative in the bottom row. Each choice will be used once. Write the letter in capital letters.**

**Function:**

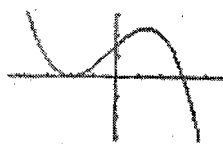
C 1)



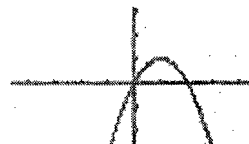
A 2)



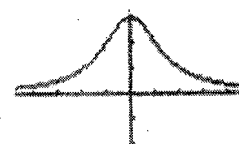
B 3)



E 4)



D 5)

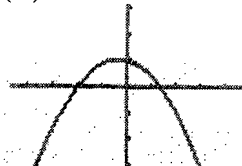


**First Derivative:**

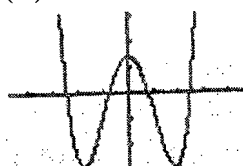
(A)



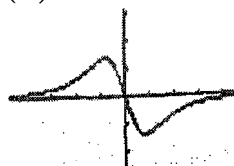
(B)



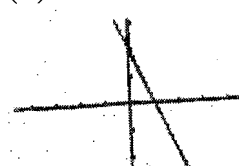
(C)



(D)



(E)



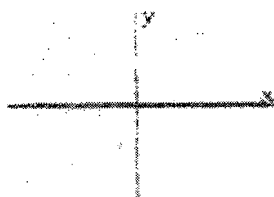
**Match each graph of the function's second derivative in the top row with the function in the bottom row. Each choice will be used once. Write the letter in capital letters.**

**Second Derivative:**

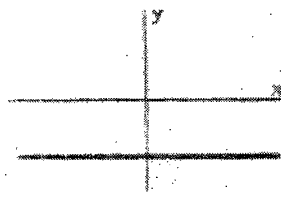
H 6)



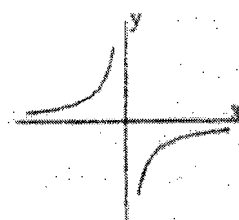
J 7)



G 8)

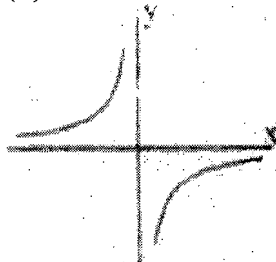


F 9)

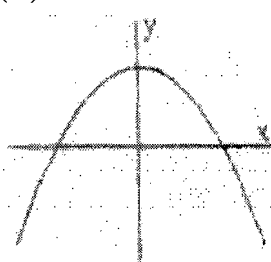


**Function:**

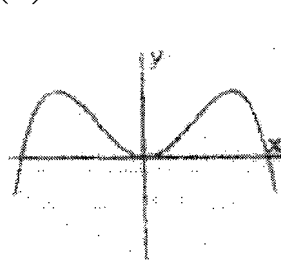
(F)



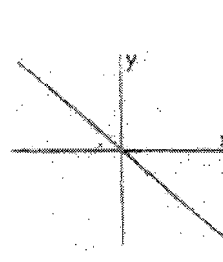
(G)



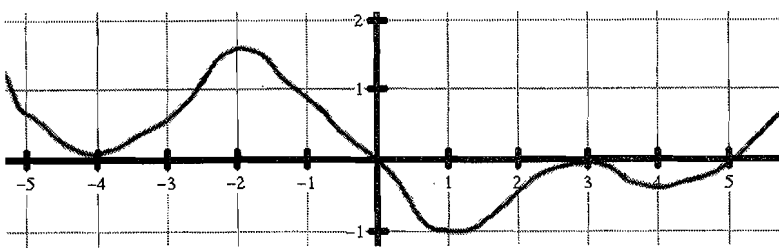
(H)



(J)



1) The graph of a function  $f'(x)$  is given. For  $f(x)$ , what are the critical points, intervals of increasing/decreasing, what are the relative max/mins, its points of inflection, and where is it concave up/down?

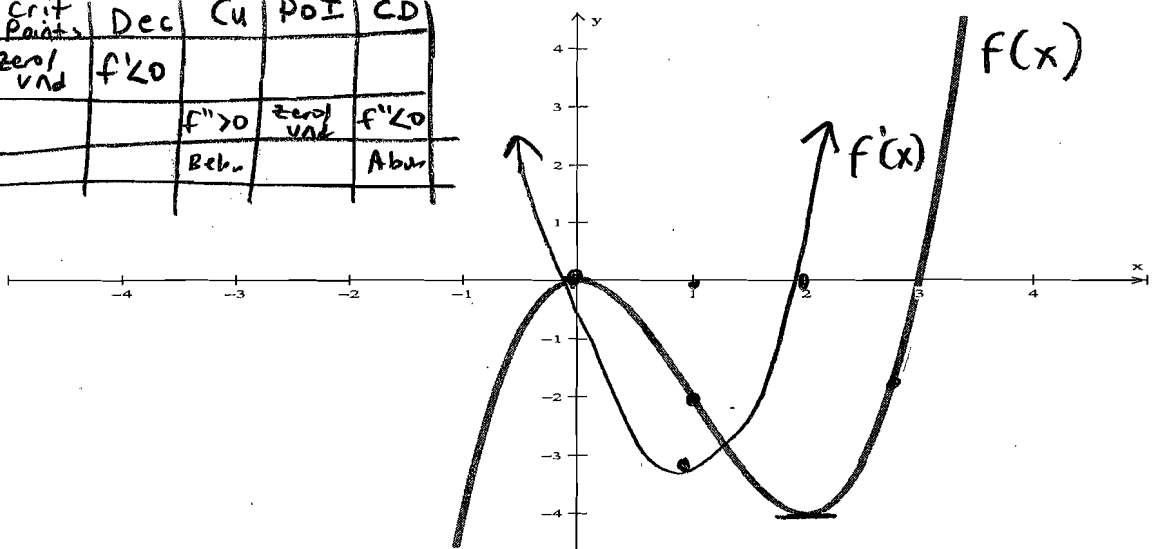


$f'(x) = 0$   
 Critical Points:  $x = -4, 0, 3, 5$   
 $f'(x) > 0$   
 $f(x)$  increasing:  $(-\infty, 0) \cup (5, \infty)$   
 $f'(x) < 0$   
 $f(x)$  decreasing:  $(0, 5)$   
 Relative Max:  $x = 0$     Relative Min:  $x = 5$   
 $f'(x) = 0$  or DNE  
 Point(s) of inflection:  $x = -4, -2, 1, 3, 4$   
 $f'(x)$  Concave Up:  $(-4, -2) \cup (1, 3) \cup (4, \infty)$   
 $f'(x)$  Concave Down:  $(-\infty, -4) \cup (-2, 1) \cup (3, 4)$

1) The graph of function  $f(x)$  is given. Establish the  $x$  and  $y$ -intercept(s), critical numbers, possible points of inflection, increasing and decreasing intervals, and concave intervals. Then, sketch the derivative

graph.

$f$	Inc	Crit Points	Dec	Cu	POI	CD
$f'$	$f' > 0$	Zero/Val	$f' < 0$			
$f''$				$f'' > 0$	Zero/Val	$f'' < 0$
T.L.				Beh.		Abn.



X-intercept(s): $(0, 0), (3, 0)$	Increasing Intervals: $(-\infty, 0) \cup (2, \infty)$
Y-intercept(s): $(0, 0)$	Decreasing Intervals: $(0, 2)$
Critical Points: $x = 0, x = 2$	Points of Inflection: $(1, -2)$ (Changes Concavity)
Relative Max: $(0, 0)$	Intervals of Concave Up: $(1, \infty)$
Relative Min: $(2, -4)$	Intervals of Concave Down: $(-\infty, 1)$